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CERTIFICATION OF SANITARY INSPECTORS IN CANADA

THE annual examinations for the certificate (C.S.I.(C.)) to be granted by the Canadian Public Health Association will be held in certain provincial centres on September 23rd, 24th and 25th.

The examinations will be practical, oral and written, and will extend over three days. One day and a half will be utilized by the candidate in making a report on an assigned local inspection and for the conduct of the oral examinations. Three written examinations covering the subjects of the syllabus will occupy the remaining day and a half.

A syllabus outlining the subjects of the examination and the requirements for registration, together with an application form and a list of recommended text and reference books and other publications, may be obtained by addressing Dr. J. T. Phair, Secretary of the Committee on the Certification of Sanitary Inspectors.

Applications must be received by the Secretary of the Committee on or before Monday, August 24th, 1936.

CANADIAN PUBLIC HEALTH ASSOCIATION

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Protamine Insulin*

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VERY soon after insulin became available it was established that a given amount of the active material produced the most favourable effects upon the hyperglycaemia and glycosuria of depancreatized dogs when it was administered frequently in small doses. These observations were soon confirmed in the clinic, but it was found possible to treat most cases of diabetes satisfactorily with two or three injections of insulin daily. The explanation of the fact that small doses produce relatively greater effect than larger ones is not completely clear, but, among the factors responsible, the excretion of greater amounts of insulin by the kidneys and destruction by enzymes present in the tissues when the larger doses are administered may be mentioned. As the purity of insulin increased, the duration of the physiological effects produced by its injection was shortened. More clinical cases came to require three to four doses daily.

The purification of insulin, although diminishing the local reaction at the site of injection, has not improved it as a therapeutic agent. As a result of this situation, a great many efforts have been made to prolong the action of insulin by combining it with a wide variety of substances but no conspicuous success was obtained before the work of Hagedorn, Jensen, Krarup and Wodstrup.[1] Their investigations have demonstrated in a very convincing fashion the effectiveness of certain protamines in delaying the absorption of insulin. It may be mentioned here also that our colleagues, Dr. D. A. Scott and Dr. Albert Fisher[2] of the Connaught Laboratories, have reported success in laboratory animals by the addition of zinc salts to insulin solutions, but these results have not as yet been applied in clinical medicine.

Physiological Aspects

In the preparation of protamine insulin* for injection, a suitable quantity of protamine, buffered with sodium phosphate, is added to regular insulin. This forms a fine, flocculent precipitate which, after shaking, may be injected like regular insulin. The

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*The first protamine used in this work was very kindly supplied to one of us (C.H.B.) by Professor Hagedorn. More recently, the sperm of the British Columbia salmon, collected by the Pacific branch of the Biological Board of Canada, has provided a source from which very satisfactory protamine has been made available by the Connaught Laboratories.

compound of protamine and insulin is not stable indefinitely and should be used within ten days of its preparation.

Protamine insulin has now been steadily used for several months on four depancreatized and several normal dogs. Solutions of insulin to which zinc has been added have been tested on normal dogs. The results of the administration of protamine and zinc insulin may be briefly summarized as follows:

(1) It is possible to maintain depancreatized dogs, which are provided with a very liberal diet, sugar free and in excellent condition on one dose of protamine insulin daily. (2) The glycosuria is much greater when one dose of regular insulin is administered daily than when the same number of units of this insulin combined with protamine is given in a single dose. (3) A very large dose of protamine insulin may be administered and the blood sugar may be kept at very low levels for long periods (18-30 hours) without the production of hypoglycaemic reactions. It would appear that insulin is liberated from the protamine combination at such a rate that its effects can be effectively counteracted by the hepatic glycogenolysis produced by such factors as the outpouring of epinephrine, which is known to take place when the blood sugar is reduced to certain levels. (4) In confirmation of the results of Scott and Fisher, we have noted that the addition of zinc to regular insulin or to purified protamine and insulin solutions results in a prolonged insulin action in normal dogs. It may be as Scott and Fisher have suggested that zinc or other metals play a part in the union between protamine and insulin. These workers have pointed out that both the regular protamine preparations and commercial insulin contain appreciable amounts of zinc and that diminution of the ash content of protamine and insulin reduces the duration of the hypoglycaemia effect when the compound of these purified materials is injected.

There are obviously a number of points which require further investigation before protamine insulin can be advantageously used by the medical profession. A large supply of a uniform and well standardized protamine preparation should be available.* It may be possible to mix the insulin and protamine before sending out the material and to add only the buffer solution just before the protamine insulin is used. This procedure has certain advantages over that tentatively adopted from the standpoint of sterilizing and preventing the contamination of the protamine solutions. If a method of stabilizing the protamine insulin compound is found, the necessity of distributing two separate solutions will be avoided.

CLINICAL ASPECTS

Over a period of two years, Hagedorn and his co-workers have treated with protamine insulin eighty-five diabetic patients of various age groups and of varying degrees of severity with very satisfactory results. The principal claim for the superiority of protamine insulin over regular insulin rests on the prolongation of its action, as shown by the blood sugar curve, its effect on glycosuria, and on the ammonia excretion as a measure of acidosis, together with an increase in the feeling of well-being of the patient. This would constitute an important improvement in present day treatment of the diabetic and, happily, can be confirmed by the work of Root, White, Marble and Stotz,[3] and by our own investigations.

This preliminary report is based on results of an experience with twenty-five cases. We are agreed that, following the administration of protamine insulin, the blood sugar curve is not lowered so precipitately as with regular insulin, but slopes off more

*We are informed that protamine insulin will probably not be available in the Connaught Laboratories for general distribution before the late summer or early autumn of this year.

gradually, is less likely to pass below normal levels, and rises slowly to previous levels. The duration of the curve is two to three times as long as when a similar dose of regular insulin is used. When patients receiving regular insulin are allowed to have a moderate glycosuria, the substitution of an equal dose of protamine insulin causes diminution in the glycosuria; ketosis improves; and the patient's feeling of well-being is definitely more marked.

In the severe, the juvenile, and the so-called unstable diabetic patients, reactions due to hypoglycaemia have been frequent when regular insulin has been used. These are found to be much less frequent with protamine insulin. We would regard this as one of the outstanding advantages of the new product. Hagedorn has pointed out, however, that when treatment with regular insulin gives satisfactory results, the use of protamine insulin is of no special value and, indeed, in conditions where more rapid action is desirable, such as in coma, the regular insulin is to be preferred.

Protamine insulin has presented new problems in the administration of insulin in regard to the number of doses necessary, the amount suitable, the timing in relation to meals, and other factors such as its use in combination with regular insulin. Hagedorn, Jensen, Krarup and Wodstrup have used a wide variety of modes of administration but seem to favour the administration of a dose of regular insulin in the morning and an evening dose of protamine insulin. Root, White, et al., have likewise treated most of their cases in this manner with successful results. Whilst we have found this mode of administration to be satisfactory in many instances, in others different adjustments of dosage and combinations of regular and protamine insulin appear to be more effective in the control of some cases of diabetes. Further experience with protamine insulin is required before general rules for its use can be formulated.

In conclusion, protamine insulin gives promise of being an important contribution to the restoration of a more physiological state in the diabetic patient.

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Twenty Years' Progress in the Sanitary Conditions of Montreal*

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THIS outline of the improvements in health conditions of the metropolis of Canada during the past twenty years, as shown by vital statistics, is not intended to be a complete study of the subject. Further, the records kept twenty-five years ago were not complete enough to allow the comparisons necessary for a detailed analysis of the situation.

We have in the archives of the health department statistical reports dating back to the year 1879, when the population of the city was only 135,000. For many years the compilation of statistical data was limited to the most important facts. For instance, the classification of deaths according to age was not started until 1919, and previous to that year it is impossible to take into consideration this factor so important in the study of the evolution of the degenerative diseases, for which no conclusions may be drawn unless specific rates are calculated.

It is deemed, however, that a very good idea of the progress accomplished can be obtained by taking into consideration:

(1) The evolution of births and deaths in connection with the population.

(2) The decreasing trend of the infant mortality.

(3) The various factors causing the death of infants and their influence on the rate of deaths under one year.

(4) The deaths from some of the most important preventable diseases, and

(5) The deaths from violence.

For this study it is thought it would be unfair to compare only two years such as 1914 and 1934, because some of the diseases in the preventable group are likely to show great yearly variations in their incidence. To eliminate this factor of error, statistical data have been grouped for two periods of five years as follows:

(1) The years 1910 to 1914, being the five years immediately preceding the twenty-year period.

(2) The years 1930-1934, being the last five years of that period.

Population, Births, and Deaths

The data relating to population, births, and deaths are presented in table I. To permit of ready comparison, the percentage increase or decrease is supplied.

From column 2 it is seen that the increase of the average population for the second period of years is 348,360 or 72 per cent. The increase of the average number of births (column 3) is only 664, or 3.4 per cent, with a resultant reduction in the birth rate of 15.8 per 1,000 population, or 40 per cent.

As regards deaths (columns 5 and 6), both the number and the rate show a decrease. Owing to the much larger population, it is easily understood that the number of deaths could not be much less in the second period than in the first, and a difference of 7.5 per cent is what might be expected. The progress made in the second period of years is much better illustrated by the figures in column 6, where it is seen that the death rate per 1,000 population has been lowered by 46.3 per cent.

Presented before the Section of Vital Statistics and Epidemiology at the Twenty-Fourth Annual Meeting of the Canadian Public Health Association, Toronto, June, 1935.

The total increase of the population in this twenty-year period has been 348,360. This increase may be attributed to (1) annexation of neighbouring municipalities: about 50,000 or 14 per cent; (2) natural increase: 202,000 or 59 per cent; and (3) immigration: 96,000 or 27 per cent.

TABLE I

CHANGES IN POPULATION, BIRTHS, AND DEATHS
1910-14 and 1930-34

Periods of five years	Population	Births		Deaths		Natural increase of population	
		Number	Rate per 1,000 pop.	Number	Rate per 1,000 pop.	Number	Rate
1	2	3	4	5	6	7	8
1910-14*.....	481,720	19,047	39.5	10,330	21.4	8,717	18.1
1930-34*.....	830,080	19,711	23.7	9,560	11.5	10,151	12.2
Increase or decrease...	+348,360	+664	−15.8	−770	−9.9	+1,434	−5.9
Percentage.....	+72.3	+3.4	−39.9	−7.5	−46.3	+16.4	−32.4

*Mean.

The natural increase or the excess of births over deaths is by far the most important factor as it represents 60 per cent of the total increase. However, the rapidly decreasing trend of the birth rate shows its influence on this factor and it can be seen by comparing the two periods in column 8; namely, a fall of 32.4 per cent in the rate of natural increment.

The lowering of the general death rate has, however, had a great part in compensating for some of the loss, because had the general death rate remained the same in both periods the reduction in natural increment would have been the same as that for births, which is 40 per cent, and the difference would have reduced by more than 50,000 the natural increase of the population.

The rapidly decreasing birth rate cannot be influenced by the Department of Health to any great extent. In this respect Montreal has followed nearly all the large cities of the world and, notwithstanding a decrease of 40 per cent in twenty years, the birth rate is still one of the highest among cities of its size.

As regards the death rate, I believe that a reduction of 46 per cent in twenty years must be considered very satisfactory. One acquires a more concrete idea of the improvement in this connection if one considers that had the death rate of the first period been continued in the second, the yearly number of deaths would have been increased by more than 8,000.

INFANT MORTALITY

The progress made in reducing infant mortality, presented in table II, is very remarkable.

TABLE II

REDUCTION IN INFANT MORTALITY
1910-14 and 1930-34

Period of five years	Births	Deaths under 1 year	Mean number of survivors over 1 year	Deaths under 1 year per 1,000 births
1910-14*.....	19,047	4,195	14,852	220.2
1930-34*.....	19,711	2,087	17,624	105.9
Increase or decrease.....	+664	−2,108	+2,772	−114.3
Percentage.....	+3.4	−50.2	+18.7	−51.9

*Mean.

It is evident from this table that the number of deaths under one year in the second period has been cut in half and that the rate per 1,000 births also has been lowered more than 50 per cent. Although the increase of births in the second period is only 664, owing to an important decline in deaths, the excess of survivors over one year of age was 2,772, an increase of 18.7 per cent.

CHIEF CAUSES OF DEATH UNDER ONE YEAR

It would have been very interesting to study in what proportion the chief causes of infant death have contributed to lower the mortality for both these periods. But, as stated above, the omission of the classification of causes of death according to ages in the statistical reports prior to 1919 makes it impossible to state with accuracy the causes of death under one year for the period 1910 to 1914. Comparison of the last period of five years (1930-34) with the period 1919-23 is, however, very interesting. The data compiled for these periods appear in table III.

This table shows that over a period of eleven years the number of births has decreased by 5.7 per cent, but that the number of infant deaths has been reduced 39.6 per cent (columns 2 and 9). The greatest difference is shown for diarrhoea and for respiratory and other communicable diseases (columns 4, 5 and 8).

If, on the other hand, we consider the death rate per 1,000 births from the above causes, we have a real picture of the progress made and of the importance of the factors contributing to it (table IV).

The infant mortality rate has decreased by 35.9 per cent in eleven years (column 8) and by 51.9 per cent in twenty years (column 5, table II). The chief factor which has contributed to lower the rate is evidently the gradual elimination of the diseases of the gastro-intestinal tract. During the period 1919-23, when 165 infant deaths occurred for every 1,000 births, diarrhoea and enteritis contributed 67.5 deaths, or 40 per cent. This was the chief cause of infant deaths, exceeding by far the prenatal and the neonatal causes, which contributed only 27 per cent of the total. But in the second period of years, eleven years afterwards, the situation is reversed: prenatal causes contributed 40 per cent of the total of 105 deaths per 1,000 births, and diarrhoea only 31 per cent. This is understood when one considers that the decrease of deaths due to diarrhoeal diseases in the second period is 51.9 per cent, while it is only 9 per cent for deaths due to prenatal and neonatal causes.

Had it been possible to make a com-

TABLE III

INFANT DEATHS ACCORDING TO CAUSE
1919-23 and 1930-34

Period of five years	No. of Births	Prenatal and Neonatal Causes	Diarrhoea and Enteritis	Diseases of the Resp. System	Infectious Diseases ex. Syphilis	Syphilis	Other Causes	All Causes
1	2	3	4	5	6	7	8	9
1919-23*.....	20,899	951	1,411	477	151	53	405	3,453
1930-34*.....	19,711	816	645	291	143	48	145	2,087
Increase or decrease.	−1,188	−135	−766	−186	−13	−5	−260	−1,366
Percentage.....	−5.7	−14.2	−54.3	−39.0	−8.3	−9.4	−64.2	−39.6

*Mean.

parison with the period 1910 to 1914 instead of 1919 to 1923, the result would have been still more striking. This is inferred from the fact that in the past twenty years deaths from diarrhoeal diseases under two years of age have declined 67 per cent compared with 51.9 per cent in the past fifteen years, and that the same proportion is applicable to deaths from diarrhoea under one year. During recent years the decrease of deaths from diarrhoea has been very rapid, the rate per 1,000 births having been cut nearly in half between 1930 and 1934, namely, by 44.5 per cent. This is very encouraging and we hope that before long diarrhoea will not account for more deaths than are now occasioned by the diseases of the respiratory system.

All groups of diseases are showing a diminution of their rate, the reduction being rather small in the prenatal group (column 2) and in the infective and syphilitic diseases (columns 5 and 6). The prenatal and neonatal problems are the most difficult. It is the experience of statisticians that here progress is made slowly and a reduction of 9 per cent may be considered quite satisfactory.

Infectious diseases, syphilis, and other causes not included in the enumerated groups are not very important factors in infant deaths.

TABLE IV

INFANT DEATHS ACCORDING TO CAUSE EXPRESSED AS RATES PER 1,000 BIRTHS
1919-23 and 1930-34

Period of five years	Prenatal and Neonatal Causes	Diarrhoea and Enteritis	Diseases of the Respiratory System	Infectious Diseases ex. Syphilis	Syphilis	Other Causes	All Causes
1	2	3	4	5	6	7	8
1919-23*	45.5	67.5	22.8	7.5	2.5	19.4	165.2
1930-34*	41.4	32.7	14.8	7.3	2.4	7.4	105.2
Increase or decrease	−4.1	−34.8	−8.0	−0.2	−0.1	−12.0	−59.3
Percentage	−9.0	−51.6	−35.1	−2.7	−4.0	−61.9	−35.9

*Mean.

DEATHS FROM CERTAIN INFECTIOUS DISEASES

Table V gives the number of deaths and the death rate per 100,000 population for typhoid, measles, scarlet fever, whooping cough, diphtheria, influenza and tuberculosis, which are in the epidemic group of diseases. No mention is made of smallpox because it has been practically non-existent in

TABLE V

DEATHS FROM CERTAIN COMMUNICABLE DISEASES
1910-14 and 1930-34

Period of five years	Population	Typhoid	Measles	Scarlet Fever	Whooping Cough	Diphtheria	Influenza	Tuberculosis (all forms)
1	2	3	4	5	6	7	8	9
1910-14*	481,720	121	78	107	102	144	50	1,033
1930-34*	830,080	32	29	30	72	51	147	846
Increase or decrease	+348,360	−89	−49	−77	−30	−93	+97	−187
Percentage	+72.3	−73.6	−62.8	−71.9	−29.4	−64.6	+194.0	−18.0

*Mean.

Montreal for many years; only six deaths have been recorded in the course of the last twenty-five years, one in 1912, four in 1913, one in 1918, and none during the past sixteen years.

For all these diseases, except influenza, the number of deaths recorded has decreased in a proportion ranging from 73.6 per cent for typhoid to 18 per cent for tuberculosis, notwithstanding the fact that between the two periods the increase of population has been 72.3 per cent. Some of these diseases, such as measles, scarlet fever, whooping cough, and diphtheria, prevail mostly among children. But as the number of births during the second period of five years and during the ten preceding years has been higher and the death rate lower, the population in the age-group 0 to 15 years was evidently higher in the second period. As the population under 15 years is greater, it is natural to expect a corresponding increase in the number of deaths from these causes. The fact that an important decrease has been recorded merits attention. When the rates per 100,000 population for these diseases during the two periods are compared, the differences are still more striking. This is shown in table VI.

VIOLENT DEATHS

This group of deaths has only a very remote connection with the Department of Health. They have been included in this paper only with the object of proving that the popular belief that such deaths are increasing is not supported by facts.

The average number of violent deaths for the period 1910-14 was 348 and for the period 1930-34, 448, representing an increase of 100 deaths, or 28.7 per cent. However, when the increased population is considered the figures reveal a decrease of 25 per cent. Expressed as rates per 100,000 population, we find that for the second period the rates for suicides and homicides are higher by 33 and 19 per cent, respectively. On the other hand, the rates are lower for poisoning by 48 per cent, for drowning by 9 per cent, for burns by 54 per cent, and for all other causes by 24 per cent.

This paper has been limited to an analysis of the main statistical facts. The progress recorded is a tribute to the excellent leadership of the present medical officer of health, Dr. S. Boucher, who, during his twenty-one years of tenure of office, has succeeded in building a sanitary organization second to none and of which he may well be proud. It is also a tribute to the foresight and vision of the administrators of the city who have given to the medical officer every facility to develop his program of health protection and to maintain a strong working organization in spite of the financial depression.

TABLE VI

DEATHS FROM CERTAIN COMMUNICABLE DISEASES EXPRESSED AS RATES PER 100,000 POPULATION
1910-14 and 1930-34

Period of five years	Typhoid	Measles	Scarlet Fever	Whooping Cough	Diphtheria	Influenza	Tuberculosis (all forms)
1	2	3	4	5	6	7	8
1910-14*	25.1	16.2	22.2	21.2	29.9	10.4	214.4
1930-34*	3.9	3.5	3.6	8.7	6.1	17.7	101.9
Increase or decrease	−21.2	−18.7	−18.6	−12.5	−23.8	+7.3	−112.5
Percentage	−84.5	−78.4	−83.8	−58.9	−79.6	+70.2	−52.5

*Mean.

This table shows the great progress made in the control of preventable diseases. Influenza is in a class by itself since epidemics, when they appear, spread so rapidly that they are not amenable to control.

The Laboratory Identification of the V Form of B. Typhosus*

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RECENT investigation has shown that the form of *B. typhosus* which occurs in human infection is characterized by antigens which are distinct from the H and O antigens and which tend to be lost on repeated subculture on laboratory media. The V form of *B. typhosus* may be identified by means of two simple tests. These tests will be described here from the point of view of their possible use in the routine diagnostic laboratory either for the rapid provisional identification of *B. typhosus* or as additional aids in the identification of this organism.

Grinnell[1] compared a number of cultures of the Rawlings strain with freshly isolated strains of the typhoid bacillus and suggested that virulent smooth cultures should be substituted for the old Rawlings strain in the preparation of typhoid vaccine. Perry, Findlay and Bensted[2] investigated the Rawlings strain further and found that its virulence and its protective qualities as a vaccine could be restored by mouse passage. Felix and Pitt[3] demonstrated that virulent living stock strains of *B. typhosus* were characterized by a very marked resistance to agglutination by O serum. Shortly afterwards the same authors reported that virulence and resistance to O agglutination were related to the presence of a new antigen which they called Vi (virulence) antigen.[4] More recent work by Felix and his associates[5] would indicate that the Vi antigen is of a complex nature.

Vi antigen has the following antigenic properties: (a) it produces an agglutinin which specifically agglutinates the virulent, O-resistant form of the organism, (b) it produces bactericidal antibody for the virulent form, (c) it produces specific phagocytosis-promoting qualities for the virulent form; and (d) it produces active immunity against infection with the virulent form and antibodies which will confer passive immunity.

Kauffmann[6] made an extensive study of the typhoid bacillus primarily from the point of view of the agglutination reactions referable to the presence of the Vi antigen. He introduced the terms "V form" and "W form" to denote, respectively, the form of *B. typhosus* which develops the Vi antigen and the form which does not do so. The V form is inagglutinable in O serum but agglutinable in serum containing the Vi agglutinin. The W form, lacking Vi antigen, is agglutinated by O agglutinin but not by Vi agglutinin. Kauffmann noted that the majority of strains recently isolated from human cases of typhoid fever were V forms and this has been confirmed by Felix, Krikorian and Reitler,[7] who found that Vi antigen was present in 88 out of 90 strains of *B. typhosus* isolated in Palestine. Craigie and Brandon[8] examined cultures from 396 specimens submitted from 283 cases and carriers in the provinces of Ontario and Quebec. The primary object of this study was to determine the occurrence of the V form in infected individuals. It was found necessary to work out methods for the satisfactory identification of V and W forms and the differentiation of pure form and mixed form cultures. It was found that with the majority of pure V form cultures, age of the particular subculture used in the ag-

*Presented at the Fourth Annual Christmas Meeting of the Laboratory Section, Canadian Public Health Association, Toronto, December 30, 1935.

glutination test had an important bearing on the behaviour of the organisms in pure V and pure O agglutinating sera. Four-hour living broth cultures of the V form invariably gave advanced agglutination in a pure V serum within two hours at 37°C. and were at the same time completely inagglutinable in pure O serum. Similarly, cultures of the W form were completely inagglutinable in the pure V serum but agglutinated rapidly in pure O serum. Older cultures of the majority of V form strains, however, lost their O-resistance and their V-agglutinability to some extent. It was concluded that only in the early logarithmic phase of growth were the V characters of *B. typhosus*, i.e., agglutinability by V agglutinin and resistance to O agglutination, at a maximum. The case and carrier cultures were therefore examined under the optimum conditions for the development of V form characters; i.e., living four-hour broth cultures were used in the agglutination tests. Examining the cultures in this way, it was found that the V form was obtained from 95.6 per cent of individuals submitting the specimens. Six individuals submitted one specimen each from which only the W form was obtained, but this, in view of the other findings and the age of the cultures before examination, does not exclude infection of these persons with the V form. Cultures from the other individuals from whom the V form was not obtained were found to contain a bacteriophage specific for the V form.

Observations on this V bacteriophage have been reported elsewhere.[8] The available evidence indicates that this bacteriophage is as specific in its action as the V agglutinin and that the bacterial substances present on the surface of the organism which are responsible for the adsorption of V agglutinin and V bacteriophage are very closely related, if not identical. Only the V form of *B. typhosus* which develops V agglutinogen is sensitive to this bacteriophage, its sensitivity being demonstrable in two ways, either by the inhibitory effect of the V phage on growth when the phage is applied to an agar plate culture or by manifest lysis of the V forms in broth culture. When a pure V form culture is lysed by this phage the secondary growth which ultimately appears consists of the W form. The W form, either phage-produced or naturally occurring, is resistant to V bacteriophage and does not adsorb it. The presence of V bacteriophage in a stool culture may result in the rapid elimination of the V form, a pure W culture thus being obtained. Apart from manifest phage action, the V form may degrade, on subculture, to the W form, the capacity to elaborate V agglutinogen being lost. Strains of the typhoid bacillus vary very greatly in their tendency to show W degradation on subculture on laboratory media. Some may show the W form after a few subcultures in broth. Others, like the strain Ty 2, are outstanding in the stability of the V form on repeated subculture. It is to be noted V → W degradation occurs independently of S-R and H-O variation. The characters of V and W forms are summarized in table I.

TABLE I

Form	Agglutinogens present	Agglutination*		Sensitivity to V Phage
		Pure V Serum	Pure O Serum	
V	V+O	++++	−	Sensitive
W	O	−	++++	Resistant

*Four-hour, living broth culture, 2 hours at 37°C.

Both V and O agglutinogens are somatic (body) antigens. Loss of O agglutinogen may occur without loss of V agglutinogen, thus giving a rough V form. V forms may be flagellate (H form) or non-flagellate.

METHODS FOR THE IDENTIFICATION OF THE V FORM

In view of the finding that a very high percentage of individuals infected with *B. typhosus* are infected with the V form, it is justifiable to employ methods for the identification of the V agglutinogen as methods for the identification of *B. typhosus*. Neither the H nor the O antigens alone are sufficient for the serological identification of *B. typhosus*. The typhoid bacillus shares the O antigen with *S. enteriditis* (Gaertner) and six other members of the *Salmonella* group. It shares its specific H antigen with two other *Salmonella* species (*S. stanley* and *S. muenchen*). As far as is known, the V agglutinogen of the typhoid bacillus is more specific than H antigen and as yet has been identified only in one strain of one other *Salmonella* species, the Witts strain of *S. paratyphi-C*.[6 (b), 11]

Craigie and Brandon[8] tested an extensive series of micro-organisms with typhoid V bacteriophage, including a series of species representative of the *Salmonella* group, and found that only the typhoid bacillus showed sensitivity to this bacteriophage. This bacteriophage differs from other phages for *Salmonella* species which have been studied in that it is a phage for heat-labile somatic antigen. The *Salmonella* phages extensively investigated by Burnet[9] and Levine and Frisch[10] showed specificity related to the heat-stable somatic O antigens which are widely shared in this genus. Typhoid V bacteriophage, on the other hand, shows a degree of specificity which would permit of its use as a diagnostic reagent not merely for *B. typhosus* but for the identification of the V agglutinogen of this micro-organism. The test for sensitivity to V bacteriophage, being simpler than the agglutination test, will be described first. It should be stated that all freshly isolated cultures of *B. typhosus* which we have examined have shown sensitivity to this bacteriophage.

PHAGE PLATE TEST

A colony suspected of being a colony of *B. typhosus* is tested for sensitivity to V bacteriophage in the following way. A portion of the colony is rubbed over a sector of a dry but not corrugated, nutrient agar plate with a smooth spreader. A loopful of potent V phage filtrate, the preparation of which is described below, is applied to the centre of the inoculated area and the plate is transferred to a 37° C. incubator. If the inoculum of organisms has been sufficiently heavy, growth will be apparent in six hours, and if the culture is the V form of *B. typhosus* an area of inhibition of growth where the phage was applied will be readily apparent. This inhibition of growth indicates

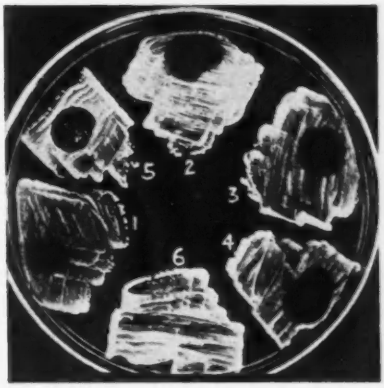

FIGURE I

Pure V form, nos. 1 to 4; mixed V and W form, no. 5; pure W form, no. 6.

sensitivity of the culture to the bacteriophage. On further incubation overnight the effect produced by the phage will be more apparent (fig. I). If the culture is a pure V culture the phage-inoculated area will be absolutely devoid of growth. If a few colonies appear, they will either be colonies of the W form of *B. typhosus* which is resistant to the phage or colonies of some contaminating micro-organism. Very rarely, in about one

to two per cent of cultures of the V form, some growth with subsequent lysis may occur, with the result that a number of nibbled colonies or a confluent growth showing a glassy degeneration will be found in the phage-inoculated area. Even late lysis such as this is readily distinguished from the unrestrained growth of the W form of *B. typhosus* or of other *Salmonella* species.

In order to obtain complete inhibition of the V form a sufficiently potent phage filtrate must be employed and care must also be taken that heavy inoculation of the plate with organisms is not carried to too great an extreme. When the plate is inoculated there should not be any visible area of opacity where the colony was spread. Potent V phage filtrates may be obtained in the following way. Half to 1/10 cc. of active phage filtrate is added to 5 cc. of broth, pH 7.6 to 7.8, and a sufficient amount of an 18-hour V form broth culture is added so as to yield a slight opacity. The tube is incubated at 37°C. While waiting for lysis to occur in this tube, the 18-hour culture is also inoculated rather heavily into fresh broth in order to provide a supply of young actively growing V culture. The broth tube containing phage is inspected at intervals and as soon as definite clearing sets in more young V form culture is added. When lysis occurs for the second time a still larger quantity of V form inoculum is added. Lysis with immediate addition of further V form culture is allowed to proceed for at least six to seven hours, and when lysis occurs again the broth culture is filtered through a Seitz EK filter which has been washed out with a buffer solution, pH 7.0, to neutralize its normal alkalinity. This method can be modified in order to yield larger quantities of phage filtrate. If 50 to 100 cc. are to be prepared, it is best to inoculate the broth with phage and a six-hour culture of the V form the previous evening so as to have available a moderately high concentration of phage the following morning. The disadvantage of commencing propagation of the phage the previous day is that without some experience as a guide to the proportion of phage and organisms to be inoculated, an undue amount of secondary growth of the W form may occur overnight. We have found the Rawlings V form a very suitable strain for the propagation of V bacteriophage. Before a culture is employed for the propagation of phage, it is plated out and phage-tested in order to ensure that it is a pure V form culture and that the W degradation has not occurred. The potency of the phage filtrate is readily estimated by making a series of tenfold dilutions of the filtrate in broth and seeding the broth very lightly with the V form of the Rawlings strain. The tubes showing clearing in twenty-four hours and several of the dilutions beyond this, are plated and phage applied to the plate culture in order to determine accurately the end-point of the phage. Using the method of propagation which has been described, filtrates active in dilutions from 10^{-9} to 10^{-11} may be obtained. For the phage plate test, filtrates active in a dilution of at least 10^{-9} should be used.

IDENTIFICATION OF THE V FORM BY THE AGGLUTINATION TEST

The V agglutinability of many V strains decreases as the culture ages, being usually much less marked in 18-24 hour agar slope cultures than it is in four-hour broth cultures. Four-hour broth cultures have an added advantage in that their use permits the carrying out of the agglutination test on the same day as isolation of the colony. If the purpose of the agglutination test is to determine whether the culture is a pure V form or a pure W form or a mixed V and W form culture, then pure O and pure V agglutinating sera must be used. In this case only a three tube test is required, since the test is a purely qualitative one (Craigie and Brandon[8]), O and V agglutination being

mutually exclusive in the case of pure form cultures and a range of serum dilutions therefore offers no advantages. A pure V serum, however, is troublesome to prepare. When the living or formalin-killed V form is injected into a rabbit, H and O agglutinins are formed in addition to V agglutinin. The H and O agglutinins are present in considerably higher titre than the V agglutinin and it is necessary to adsorb the H and O agglutinins completely in order to obtain a pure V serum. This requires massive and frequently repeated adsorption with a W culture such as H 901 and subsequently rigorous testing of the serum for absence of H and O agglutinin. A V serum, however, does not require adsorption, provided that four-hour broth cultures are employed, if the object in its use is merely the identification of *B. typhosus*. The degree of flagellar development in four-hour broth cultures is usually very slight, and even so, the degree of H agglutination with such a culture in two hours at 37°C. is rarely perceptible. As has been stated above, nearly all freshly isolated cultures of *B. typhosus* are V form cultures and thus in four-hour broth culture are resistant to O agglutination. Any agglutination which will occur, therefore, with a four-hour broth culture of a freshly isolated strain will be predominantly V agglutination and the V agglutination of *B. typhosus* is at least as specific as is its H agglutination.

A V agglutinating serum for *B. typhosus* is prepared in the following way. An 18-hour agar slope culture of a pure V form (Rawlings) is washed off with saline and killed with 0.25 per cent formalin. A series of intravenous injections of 500 million and 2,500 million organisms is given to a rabbit at four to five day intervals for five injections. A serum sample is taken and if of satisfactory titre the animal is bled out on the fifth and sixth day after the last injection. The V titre of the serum is tested in the following way. A series of twofold dilutions from 1:40 to 1:2,560 in 0.4 cc. of saline is set out and 0.1 cc. of a four-hour broth culture of a pure V form is added to each tube. The tubes are incubated for two hours at 37°C. and then examined. If any H agglutination should occur, it is readily distinguished by its flocculent character and the fact that no concomitant decrease in opacity of the tube occurs. O agglutination will not occur since the test culture used was a young pure V form culture. Any granular agglutination which takes place will therefore be due to the presence of V agglutinin.

When a portion of a colony is transferred to an agar plate for the phage-plate test, another portion may be transferred to a tube containing 1 cc. of nutrient broth. Sufficient growth will occur in three to four hours to permit of the V agglutination test being carried out. It should be pointed out that in this agglutination test living, actively growing cultures are used and that since no preservative is added to the serum employed, growth occurs during the period of two hours' incubation at 37°C. This continued growth during the period of incubation greatly enhances the clear-cut nature of the coarse granular V agglutination, which is extremely rapid with very young broth cultures. With V serum in a concentration eight to ten times its titre, many V form cultures will show macroscopically visible agglutination within half an hour, and all will show definite agglutination in two hours at 37°C. In addition to the tube containing the V serum and a saline-suspension control tube, a tube containing O serum 16 to 20 times its titre may be included. As pointed out in a previous paper (Craigie and Brandon[8]), O agglutination is extremely rapid when a living four-hour broth culture is employed. The O serum tube will, however, be found to be negative with nearly all cultures and its inclusion, apart from providing an additional control, has no advantage except for the recognition of an occasional W form culture. A W

form culture direct from the primary isolation plate generally indicates the presence of V bacteriophage in the culture or specimen of origin.

In a study of over 400 cultures[8] a complete correlation was found between agglutinability in pure V agglutinating serum and sensitivity to V bacteriophage. While the agglutination test employs an orthodox reagent, i.e., V agglutinin, for the detection of an antigen, the phage test has the following features to recommend it:

1. It can be much more rapidly applied than the agglutination test.

2. With a little experience in its use, inhibition of growth of the V form of *B. typhosus* can be demonstrated within six hours from the selection of a suspected colony.

3. It will give a positive result with a very high percentage of freshly isolated strains of *B. typhosus*. Indeed, resistance of a freshly isolated strain of this organism to V phage probably indicates that V phage was present in the specimen from which the culture was derived.

Extensive trial of V bacteriophage by laboratories engaged in routine diagnostic work will, of course, be necessary before its value under such conditions can be assessed, but the study which has already been made of this phage indicates that it is worthy of such a trial. Only by very extensive application of the V phage test to freshly isolated *Salmonella* cultures can it be determined whether sensitivity to V bacteriophage is specifically confined to *B. typhosus*. No *B. paratyphosus* B strains sensitive to this phage have been encountered and this is in agreement with the finding of Felix and Pitt[11] that the Vi antigen of this species is serologically distinct from that of *B. typhosus*. The reader is referred to another paper[8] for a discussion of the work of Burnet and Levine and their coworkers which has shown that sensitivity to strains of bacteriophage is in most cases specifically related to the presence of heat-stable antigens in the bacterial cell. The present position with regard to V phage may be summed up in the statement that the same antigen appears to be responsible for the adsorption of V agglutinogen and for the adsorption of V phage. It is obvious, therefore, that any V phage sensitive strains of *Salmonella* species other than *B. typhosus*, or any V phage resistant virulent strains of *B. typhosus* which future investigation may reveal, will be of more than passing interest. Apart from the significance of such strains in the future investigation of the nature and specificity of bacteriophage, strains of *B. typhosus* atypical in their reaction to V phage may prove of value in the further immunological investigation of the antigenic qualities included under the term Vi (or virulence) antigen.

ACKNOWLEDGMENTS

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Criteria for the Selection of Suitable Strains of B. Typhosus for Use in the Preparation of Typhoid Vaccine

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THE choice of the Rawlings strain of *B. typhosus* in the preparation of typhoid vaccine by Leishman et al.[1] in 1905 for use in British troops was chiefly based on certain characteristics of the micro-organism which particularly suited it for demonstrating blood changes in vaccinated individuals. This is indicated by the following quotation from Leishman et al.[1]: "This strain was one which furnished a very even and satisfactory emulsion from an agar culture and was thus more suitable for some parts of the work which lay before us. Both strains [G and R] being of low virulence, preference was accordingly given that which promised to give more regular results in our test experiments, and the strain R was therefore employed both in the preparation of the vaccine and in the daily quantitative tests of the protective substances developed with blood of the inoculated." The Rawlings strain has been used continuously since that time, save for a brief period in 1933, in the preparation of typhoid vaccine for the British army and by many other laboratories throughout the world.

Recently certain biological variations have been noted in the characteristics of the Rawlings strain. Grinnell[2] showed the contrast in the immunizing value for mice of the Rawlings strain as compared with a recently isolated strain of *B. typhosus*. The latter was found to be more efficacious. Perry et al.[3], demonstrated a marked change in the Rawlings strain used in the preparation of vaccine for the British army and found it was much less effective in immunizing mice than was a recently isolated strain known as Allahabad. This difference was so striking that the Allahabad strain was substituted in the preparation of typhoid vaccine at Millbank. Further work on the Rawlings strain by Perry et al.[4,5], demonstrated that, by repeated mouse passage, its value as an immunizing agent could be enhanced and brought up to equal that of recently isolated strains of *B. typhosus*. The Rawlings strain was accordingly reintroduced in the preparation of typhoid vaccine. This strain has been called the rejuvenated Rawlings or Rawlings (Ben), by Kauffmann[6]. Felix and Pitt working with various strains of *B. typhosus* in regard to their agglutinability and virulence introduced the term Vi denoting an antigenic component of *B. typhosus* which was associated with virulence and protective power when used as a vaccine. Felix[7] demonstrated that certain strains of *B. typhosus* were inagglutinable in O serum at 37°C. and these strains when used as vaccines conferred high protection in mice. To this component he gave the name Vi antigen.

Thus it would seem from protection experiments in mice that for the purpose of conferring a high degree of immunity it is necessary to use a strain of *B. typhosus* which is of high virulence and contains the Vi antigen. The rejuvenated Rawlings strain possessed these characteristics. In August, 1934, the rejuvenated Rawlings strain of *B. typhosus* was introduced in the preparation of typhoid vaccine in these laboratories. It occurred to us from experience with other micro-organisms and also the method used in rejuvenating the Rawlings strain that it would

be necessary to resort to frequent mouse-passage in order to retain the characteristics described by Perry et al.[5], and Felix and Pitt[7]. Accordingly for sake of comparison a subculture of the rejuvenated Rawlings strain was transferred each month from agar to agar and another subculture of the same strain was passed through mice each month by intraperitoneal injection with subsequent recovery from the heart's blood. At the end of four months it was observed that these two subcultures showed serological differences. The subculture which was maintained on agar lost its resistance to O agglutinins at 37°C., being readily agglutinated, whereas the mouse-passed strain remained fully resistant to O agglutinins at 37°C. (see tables I and II). This was the first indication of any change or dissimilarity in the two strains. It was also shown that the mouse-passed strain was agglutinated to titre when set up with a pure V serum (Kauffmann)

TABLE I

AGGLUTINATION REACTIONS OF B. TYPHOSUS REJUVENATED RAWLINGS AGAR SUBCULTURED

At 37° C. for 1½ hours—ice-box temperature overnight—24 hour reading

Serum	Serum diluted 1 in							
	200	200	400	800	1600	3200	6400	12800
B. typhosus ViHO.	++++	++++	++++	+++ F	++ F	+ F	neg.	neg.
B. typhosus O....	++++	++++	++++	++ G	++ G	+ G	neg.	neg.

	Serum diluted 1 in							
	100	1000	2000	4000	8000	16000	32000	64000
B. typhosus H....	++++	++++	++++	++++	++++	++++	F	F

TABLE II

AGGLUTINATION REACTIONS OF B. TYPHOSUS REJUVENATED RAWLINGS MOUSE-PASSED

At 37° C. for 3 hours—ice-box temperature overnight—24 hour reading

Serum	Serum diluted 1 in							
	100	200	400	800	1600	3200	6400	12800
B. typhosus ViHO.	++++ F	++++ F	++++ F	F	F	F	F	neg.
B. typhosus O....	neg.	neg.	neg.	neg.	neg.	neg.	neg.	neg.

	Serum diluted 1 in							
	100	1000	2000	4000	8000	16000	32000	
B. typhosus H....	F	F	F	F	F	F	neg.	

Control—negative.
++++=complete agglutination, clear supernatant.
F=floccular precipitate, cloudy supernatant.
G=granular precipitate, cloudy supernatant.

and that the agar subcultured strain was not agglutinated by the V serum. Thus these two strains differed serologically.

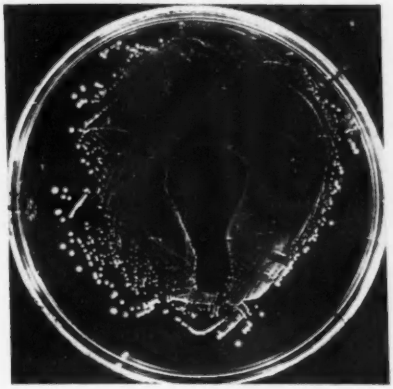

FIGURE I.

B. typhosus Rawlings (Ben).
Mouse-passed with V bacteriophage.

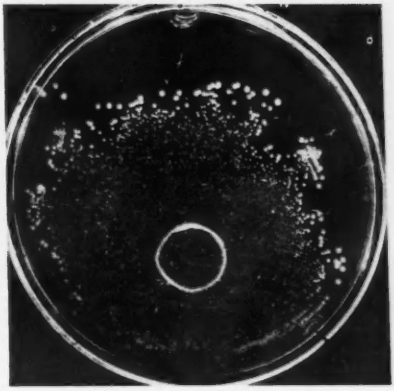

FIGURE II.

B. typhosus Rawlings (Ben).
Agar subcultured with V bacteriophage.

PROTECTION TESTS

The difference in serological qualities between the mouse-passed and the agar subcultured strain led us to compare their relative protective value when used as vaccines in mice against fatal doses of living mouse-passed *B. typhosus* Rawlings (Ben). Two lots of vaccine were prepared according to the standard practice using the mouse-passed strain for one lot and the agar subcultured strain for the other lot and were labelled preparations 3-35 and 4-35, respectively. The *B. typhosus* Rawlings (Ben) had been subcultured on agar five successive times at monthly intervals and had been mouse-passed on two successive occasions prior to making up preparation 3-35. A group of eighty-five mice was selected, the weights ranging between 18 to 20 gm. Thirty mice received intraperitoneally 50 million and 100 million one week apart of lot 3-35 (heat killed at 56°C. for one hour, to which was added 0.35 per cent tricresol). Thirty mice received intraperitoneally 50 million and 100 million one week apart of lot 4-35 (heat killed at 56°C. for one hour, to which was added 0.35 per cent tricresol). Twenty-five mice were reserved as controls. It was estimated by injecting normal mice intraperitoneally with varying amounts of living *B. typhosus* Rawlings (Ben), that the lethal dose was approximately 175 million. Ten days after the second injection of vaccine, the control mice received intraperitoneally 175 million living *B. typhosus* Rawlings (Ben) and the mice vaccinated with lots 3-35 and 4-35 each received twice this amount, namely, 350 million.

The results are presented in table III.

Vaccine lot 3-35 prepared from the mouse-passed *B. typhosus* Rawlings (Ben) completely protected against 350 million living *B. typhosus* whereas only 8 out of 24 mice vaccinated with lot 4-35, the agar subcultured strain, survived.

As a further comparison of the efficacy of lot 3-35 vaccine we compared its protective value with that of a sample of typhoid vaccine produced in another laboratory, known as 24 K.I. This vaccine was from a lot in current use for human vaccination.

The 24 K.I. vaccine was prepared from the old strain *B. typhosus* Rawlings. One hundred and two mice were selected of weights from 18 to 20 grams. Forty-one mice were each given intraperitoneally 50 million and 100 million one week apart of lot 3-35 vaccine. Forty-one mice were each given intraperitoneally 50 million and 100 million one week apart of 24 K.I. Twenty mice were reserved as controls. Ten days following the last injection of vaccine the mice were injected intraperitoneally with living *B. typhosus* Rawlings (Ben). Table IV presents the results.

Sensitivity of Cultures to V Bacteriophage

Craigie[8] has reported a bacteriophage to which the V form (Kauffmann) of *B. typhosus* is specifically sensitive. The mouse-passed and agar subcultured strains of *B. typhosus* Rawlings (Ben) were grown in broth for three hours and streaked out on agar plates to which a large loopful of the V bacteriophage was added. These plates were incubated 18 hours at 37°C. It was observed that the mouse-passed strain was lysed, whereas the agar subcultured strain was completely resistant. This result is illustrated in figs. I and II. It would appear from these findings that the mouse-passed strain of *B. typhosus* Rawlings (Ben) when grown in a three-hour broth culture is a pure V form, whereas the agar subcultured strain of the same micro-organism is a pure W form (Kauffmann).

SUMMARY

The method employed in maintaining a strain of *B. typhosus* used in the preparation of typhoid vaccine seems to be important.

These findings show that *B. typhosus* Rawlings (Ben) when maintained on agar loses its inagglutinability to O serum, is not a good immunizing agent for mice, and becomes resistant to V

TABLE III

MOUSE PROTECTION TESTS

Controls	Lot 3-35 Vaccinated	Lot 4-35 Vaccinated
24 mice injected with 175 million living *B. typhosus*	24 mice injected with 350 million living *B. typhosus*	24 mice injected with 350 million living *B. typhosus*
	Results 72 hours	
22 dead* 2 survived	All survived	16 dead 8 survived

**B. typhosus* recovered from heart's blood.

TABLE IV

MOUSE PROTECTION TESTS

Control Mice	Lot 3-35 Vaccinated		Lot 24 K.I. Vaccinated	
20 mice injected with 175 million living *B. typhosus*	21 mice injected with 350 million living *B. typhosus*	20 mice injected with 700 million living *B. typhosus*	21 mice injected with 350 million living *B. typhosus*	20 mice injected with 700 million living *B. typhosus*
		Results 72 hours		
2 survived 18 dead*	21 survived	17 survived 3 dead*	5 survived 16 dead*	2 survived 18 dead*

**B. typhosus* isolated from heart's blood.

bacteriophage; that is, it is degraded to the W form of Kauffmann. In contrast to this, the mouse-passed strain retains its V character; it remains inagglutinable in O serum at 37°C., protects mice to a considerable degree against living *B. typhosus* and is lysed by V bacteriophage.

The exact explanation of these findings is not known at present.

It is suggested that a strain of *B. typhosus* used in the preparation of typhoid vaccine should be maintained in such a manner as to preserve its biological characteristics as closely as possible to those possessed at the time of original isolation, or what is known as the V form.

In the case of *B. typhosus* Rawlings (Ben), mouse passage appears to facilitate the retention of its characteristics as a V form.

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NATIONAL HOSPITAL DAY

THROUGHOUT Canada, as in the United States, May 12th, the birthday of the Patron Saint of Nursing, Florence Nightingale, will be observed as National Hospital Day. Cities, towns, and rural areas have the opportunity of centring attention that day on their local hospitals, interpreting the services rendered, indicating needs, and creating new friends. "Open house" at the hospital affords the opportunity for the citizens to become acquainted with the institution and its staff, breaking down prejudices that too often exist. National Hospital Day should be a day of thanksgiving for the gifts of science so bountifully inherent in hospital service.

A Summary of the Results of Treatment in Early Syphilis

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IN September, 1934, there appeared in this Journal a summary of the results of treatment in early syphilis from the special treatment clinic of the Toronto General Hospital. The article opened with the statement that "evaluation of the clinical results obtained in the treatment of syphilis, particularly early syphilis, in various clinics is essential if progress is to be made in its control". We have, therefore, made a study of the cases of early syphilis treated in the special clinic at the St. Boniface Hospital over a period of ten years. The clinic was quite small at its beginning and was simply a unit of the regular Out-Patient Department of the Hospital, but from October, 1933, it has operated as the Venereal Disease Clinic of the Department of Health and Public Welfare of the Province of Manitoba.

This summary covers cases of early syphilis treated until June 30, 1934. These cases, however, have been under observation for one year or more. The total number of cases included in this summary is 240 and the method used by the Toronto clinic for reporting the data is followed here.

Social Aspects of the Problem

This clinic has attached to it a public health nurse who is responsible for the follow-up work and the bringing in of contacts for examination. Of 10 husbands examined in this regard, 5 were found to have positive Wassermanns; of 9 wives examined, 5 had positive Wassermanns; and of 40 children examined, 5 were found to be luetic. Until the present time, it has been rarely necessary to report cases to the Department of Health for their failure to continue treatment. Those cases who show a tendency to be delinquent are usually brought back for treatment through the efforts of the social service worker.

With the mixed population in this province, it may be of interest to note the division of the 28 nationalities represented in these 240 cases: Ukrainian 29, Canadian 28, German 25, English 22, Polish 19, Scotch 16, Swedish 11, Irish 10, French 10, French-Canadian 7, Danish 7, Chinese 5, Hungarian 5, Russian 4, Norwegian 4, Austrian 3, Ruthenian 2, Italian 2, Finnish 2, American 2, Rumanian 2, Icelandic 2, Dutch 2, Belgian 1, Lettish 1, Greek 1, Assyrian 1, Half-breed 1, and not given 16.

The marital condition of these patients indicates that 134 were known to be single persons, 71 known to be married. The remainder were either widowed, separated, or the marital state unknown.

The age-groups into which these patients fall are of interest (table I).

TABLE I

240 CASES OF SYPHILIS BY AGE GROUPS AND SEX

	16-20	21-25	26-30	31-35	36 and over	Unknown
M..	9	48	42	24	29	4
F...	33	31	7	5	5	3
	42	79	49	29	34	7

Medical Survey

The 240 cases are considered according to the time of the commencement of treatment and fall into the following three groups:

	Male	*Female*	*Total*
Sero-negative primary syphilis	44	5	49
Sero-positive primary syphilis	58	15	73
Secondary syphilis	54	64	118
Total	156	84	240

It would appear from this that the females are not coming for treatment as early as the males, as, with the females constituting only 35 per cent of the total cases, we find them outnumbering the males in the secondary group. The disproportion between males and females in the primary groups is most noticeable in the sero-negative group.

The duration of the disease before treatment was started was from a few days to two weeks in the primary sero-negative group, generally from four to five weeks in the primary sero-positive group, and usually a few months in the secondary group.

The amount of treatment used in the cases which were considered to be cured is shown in table II.

tion are also considered to be cured. These two groups constitute the cases which we consider as being cured.

TABLE III

RESULTS OF TREATMENT BY STAGE OF DISEASE

	Sero. Neg. Primary	*Sero. Pos. Primary*	*Secondary*	*Total*
Cured	11	27	41	79
Probably cured, still attending for observation	0	20	36	56
Still attending	12	4	12	28
Transferred	2	7	2	11
Lost	24	15	27	66
Total	49	73	118	240

Considering the percentage distribution of the results in the different types of disease, it is found that 56.2 per cent of all these patients have been cured and that only 27.5 per cent have been lost, which seems a comparatively small wastage when one considers that a large percentage of clinic material is from the proportion of the population which has no fixed abode. These results are presented in table IV.

If one considers only the patients who have attended satisfactorily for their treatment, the percentage cured is very materially higher (table V). By leaving out the patients who have been lost or who have been transferred, it would appear that of the remaining patients 82.7 per cent can considered as cured.

TABLE II

AMOUNT OF TREATMENT USED IN CASES CONSIDERED CURED

	Least Amount	*Greatest Amount*	*Average Amount*
Primary sero-negative	41 x 914 41 x bismuth	58 x 914 64 x bismuth	44 x 914 53 x bismuth
Primary sero-positive	20 x 914 11 x bismuth	62 x 914 66 x bismuth	39 x 914 40 x bismuth
Secondary	28 x 914 28 x bismuth	100 x 914 117 x bismuth	41 x 914 43 x bismuth

Results of Treatment

The results of the treatment are presented in tables III, IV, and V. Those who are considered to be cured have been discharged from treatment and those who are listed as probably cured but still attending for observa-

TABLE IV

PERCENTAGE DISTRIBUTION OF RESULTS IN DIFERENT TYPES OF DISEASE

	Sero. Neg. Primary	*Sero. Pos. Primary*	*Secondary*	*Total*
	%	%	%	%
Cured	22.5	37	34.8	32.9
Probably cured, still attending for observation	0	27.4	30.5	23.3
Still attending	24.5	5.5	10.2	11.7
Transferred	4.1	9.6	1.7	4.6
Lost	49.	29.5	22.9	27.5

The fact that the primary negative cases do not show any patients still attending for observation may be somewhat difficult to explain. One feature which probably has some bearing on this situation is that these patients are given to understand that since they have placed themselves under treatment in the sero-negative stage of the disease, there is every reason for them to expect a cure after they have received the prescribed course of treatment and, consequently it may be that these patients do not feel that further observation is really necessary. The findings of the Health Committee of the League of Nations would be justification for this belief.

TABLE V

PERCENTAGE DISTRIBUTION OF RESULTS FOR THOSE ATTENDING SATISFACTORILY

	Sero. Neg. Primary	*Sero. Pos. Primary*	*Secondary*	*Total*
	%	%	%	%
Cured	47.8	52.9	46	48.4
Probably cured, still attending for observation	0	39.2	40.4	34.3
Still attending	52.2	7.9	13.4	17.3

Comparison of Treatment Results according to Sex

The patients who were considered cured comprised 80 males and 55 females, indicating that 51.3 per cent of the males and 65.5 per cent of the females were considered as being cured. Although we do not get as high a percentage of females as males for treatment in the two primary stages, still, on the whole, the percentage of cures is higher in the females.

Of 102 males and 20 females in the primary stages, about an equal percentage was lost; namely, 39.2 per cent and 40 per cent, respectively. In the secondary stage out of 54 males and 64 females, 27.7 per cent and 21.8 per cent, respectively, were lost. It may be a little difficult to know why this is so, but although they may pay less attention to the disease in the primary stage, the females apparently are more persistent in taking treatment. The male population also may conceivably be more floating in character than the female.

All the cases which are considered as cured receive complete physical and laboratory examinations. Table VII indicates the percentage of cured

TABLE VI

DISTRIBUTION ACCORDING TO SEX

Classification according to Time of Treatment	*Cured and probably cured*				*Not cured as far as known*						*Total*
	Cured		*Attending for Observation*		*Attending for Treatment*		*Transferred*		*Lost*		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
A. Primary S. N.	9	2	0	0	11	1	2	0	22	2	49
B. Primary S. P.	23	4	17	3	2	2	6	1	10	5	73
C. Secondary	20	21	11	25	8	4	1	1	14	13	118
Total	52	27	28	28	21	7	9	2	46	20	240

cases in each of the three groups along with the blood and spinal fluid findings.

TABLE VII

FINDINGS IN "CURED" CASES

	Per cent. cured	*Negative Blood Wassermann*	*Negative C.S.F.*
	%	%	%
Primary sero-negative.....	22.4	100	100
Primary sero-positive.....	64.4	100	100
Secondary.....	65.3	100	100
All cases treated...	56.2	100	100

In all the cases treated for one year, there was only one (0.4 per cent) that showed cells and globulin in the cerebro-spinal fluid and it was Wassermann negative, and only 13 (5.4 per cent) had positive blood Wassermann tests.

Discussion

Twenty-seven per cent of the patients discontinued treatment (recorded as "lost"). This number may seem large at first sight, but we are encouraged by reading Dr. John H. Stokes' recent statement that in a public clinic 30 per cent regular attendance was "fair", 50 per cent "good", and 70 per cent was "wonderful".

We have noted the recent findings of various investigators that seropositive primary syphilis is the least curable of any type of early syphilis and we are now giving, as recommended, ten extra injections of arsenic in this type of case.

Our average dose of 914 has been quite conservative for we are convinced that the skin of patients will not tolerate arsenic as well in this rigorous dry climate as it will in localities where the air is more moist and the climate more equable.

The following factors we believe aided in obtaining the good results shown:

1. A complete physical examination of every patient before starting treatment.
2. A frank and friendly discussion with each patient about the nature of his disease and his chances for cure, and the necessity of his co-operation.
3. Prompt dark-field examination of every suspicious lesion.
4. The use of the continuous overlapping scheme of treatment with 30 to 40 injections of 914 and 50 to 60 injections of bismuth as a standard.
5. A carefully worked out technique of administration of both arsenic and bismuth, rigidly followed, to minimize toxic reactions and local discomfort.
6. Periodic blood Wassermann tests.
7. A complete spinal fluid examination towards the end of the first year.
8. An efficient social service worker.

Construction and Equipment in Relation to the Operation of Swimming Pools*

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WHEN the attention of health authorities was first directed to swimming pools as a probable means of the transmission of communicable disease, they concentrated their efforts primarily on devising methods whereby the pool water could be maintained in such a condition as to reduce this probability to a minimum. This involved consideration of the treatment of the water itself and such factors as the general sanitation of the surroundings of the pool, shower and dressing rooms, lavatories, laundries, etc., and the regulation of bathers, so far as the compulsory observance of the elementary principles of personal hygiene was concerned. Naturally enough, practically all working rules and regulations governing the operation of swimming pools were based on these factors and to-day they still remain the guiding force, as it were, to all things pertaining to pool control. It is true that the original idea has been modified or elaborated, as the case may be, in the light of newer developments and as a result of experience, but the underlying principle remains the same.

With the increasing popularity of the swimming pool as a place of recreation, additional problems are being presented to those charged with the responsibility of safeguarding the health of the community. One must consider the necessity of eliminating the risk of personal injury by the provision of proper safeguards and details of construction prepared with this end in view are being laid before health departments for their approval. Competitive swimming has also reached the stage where the making of new records depends to a great extent on the most exact measurements of time and distance, so that one is faced with an increasing demand for pools and equipment conforming to the rigid standards laid down by the International Committees representing all local swimming associations. When the sanitary aspect of swimming pool control was first under discussion by health officials, and that means only a matter of twenty-five years or so ago, a few investigators were quick to realize that the type of construction and the nature of the equipment would have a distinct bearing on the subsequent operation of the pool and maintenance of healthful conditions. In particular, one should pay tribute to Stephen De M. Gage, Chairman of the Joint Committee on Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers, for the pioneer work undertaken when he was associated with the Rhode Island State Department of Health. His foresight in correlating the factors of construction, equipment, and operation, has contributed in no small degree to the improvements effected since that time. The bearing which construction may have upon operation will now be discussed briefly.

The old type of "fill and draw" pool, which requires to be emptied, cleaned and refilled with fresh water at short intervals, with all the attendant delay during those operations,

*Presented before the Public Health Engineering Section at the Twenty-fourth Annual Meeting of the Canadian Public Health Association, Toronto, June, 1935.

extra hours of labour, high cost of heating a large amount of water for a short time of use, together with the cost of the water itself, may be dismissed briefly as obsolete. This type of pool would not be considered today, save in instances where a small capacity is desired, such as private plunges, where the bathing load is normally low. Hence this discussion will be confined to re-circulating pools only.

In proportioning the shallow and deep areas in pools, due consideration should be given to the type of bather, rate of turnover, and fluctuation in the bathing load. This applies particularly to large open-air pools, which are subject to wide variations in bathing loads, and are patronized to a great extent by persons who look upon the pool solely in the light of a recreational centre during the hot summer months. Under these conditions, shallow areas may become overcrowded during peak loads; a case is on record where it was necessary to extend the existing shallow area, at no small cost, in order to overcome this undesirable condition.

In order to assist the cleansing of the sides and bottom of the pool, a smooth and non-absorbent surface is essential. The easy detection of sediment against a white background is both an incentive and an aid to the operator. White glazed tile will fulfil these requirements and is now almost universally adopted for indoor pools, but, unfortunately, the question of cost and our climatic conditions render it prohibitive for those out-of-doors. Outdoor pools are exposed to considerably more pollution, in the nature of solid matter, other conditions being equal, than those housed indoors. Wilkinson and Forty recommend finishing the surfaces of open air concrete pools with a render of pure white cement and white aggregate, machine polishing to produce a smooth finish.

The question of the most efficient arrangement and number of inlets and outlets and the design of scum gutters still remains largely a matter of opinion and offers a wide field for useful investigation. The successful removal of suspended matter, elimination of dead spots, and the satisfactory mixing of disinfecting solutions depend in large part upon the manner in which the water is distributed throughout the pool. Connections between the main drain and the sewer should be provided with an air-break to eliminate the possibility of sewage backing up into the pool.

Scum gutters serve three important purposes. They act as receptacles into which bathers expectorate, as hand-rails for support, and a means of removing surface scum by flooding the pools. As fresh sputum is an important factor in the spread of bacterial pollution, scum gutters should be so designed as to shape, capacity, and drainage that all overflow from the pool is adequately trapped. It has been suggested that gutters be automatically and periodically flushed, thus making cleaning independent of wave action. Operators can also assist in the proper functioning of scum gutters by regulating the water level in the pool to a point where the amount of water driven over into the gutter during bathing periods is not excessive.

Most indoor pools are now provided with seating accommodation for spectators arranged to prevent soiling of the surrounds about the pool and, for this reason, not so much stress is placed on this factor as a contributory cause to the pollution of the water as in former years. Nevertheless, surrounds need to be well drained and preferably slope away from the pool edge. Methods of drainage employing the scum gutter for this purpose have not proved satisfactory as a general rule, owing to the difficulty of controlling hosing operations, with the result that the flushings jump the gutter and reach the pool. Outdoor pools are still faced with the problem of pollution introduced by spectators; hence proper arrangement of surrounds and their drainage are of vital importance.

Sun-bathing areas are also becoming increasingly popular as an adjunct to outdoor pools. This adds to the

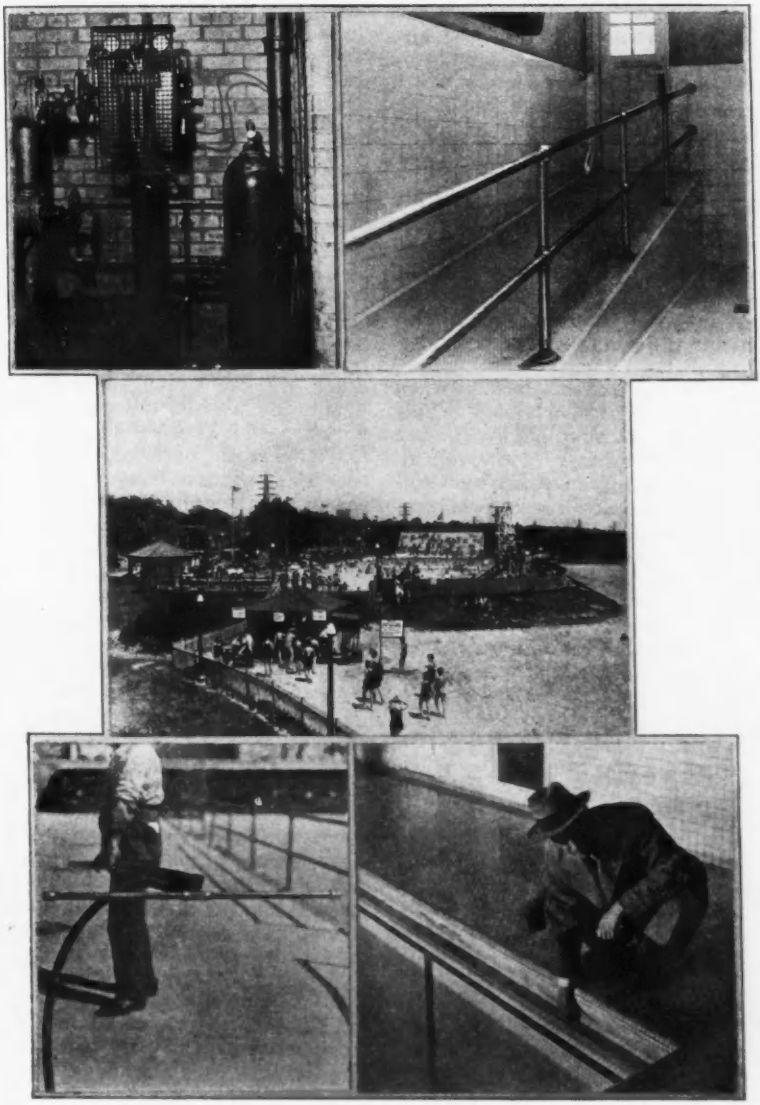
difficulty of keeping sand beaches clean, unless exposed to the action of tidal waters. Sand beaches also involve the use of additional showers and extra supervision to ensure the removal of sand prior to re-entry to the pool. Beds of sea shingle have been found satisfactory in some instances as this material may be periodically washed with chlorinated water.

Grass areas and trees located in the immediate vicinity of outdoor pools are objectionable, since leaves, seeds and the grass itself may be transferred to the pool, resulting in excessive clogging of strainers and, in some cases, of the filters themselves.

Turning now to the matter of equipment in relation to operation, it is axiomatic that this should combine a maximum of efficiency with simplicity of operation. Simplicity of operation does not imply a dearth of equipment; in fact many pools could be operated with less expenditure of time and trouble if certain additional pieces of equipment had been installed at the outset. Filters, pumps, chlorinators, etc., should be located with due regard to the space required for easy and accurate operation, with plenty of head room for the inspection of filter beds, all filter shells being provided with manholes for this purpose. Too often one finds the quarters allotted to this machinery cramped as to room, and inconveniently placed in some poorly lighted spot. Under these conditions one may hardly be surprised if equipment suffers through lack of attention.

It is not the intention to describe the different types of filtration systems now on the market, but rather to draw attention to details which are sometimes overlooked prior to installation.

For example, backwashing of filters at Toronto pools is effected by fresh water obtained under pressure from city mains. As these pressures vary at different points throughout the city, it may be necessary in some cases to instal wash water regulating valves in order to prevent too high a rate of wash, with the consequent danger of loss of filtering medium. Attention should also be drawn to the necessity of properly safeguarding all cross-connections between the recirculating system as a whole and any city water supply, and, for a similar reason, an air-break should be placed between the wash water drain and the sewer. Pumping and filter capacities require to be carefully studied in relation to the bathing load and today the tendency is to higher turnover rates. The accurate control of coagulants is essential to the production of a good effluent; this important fact has long been recognized in all fields of water purification. The usual method of application to swimming pool water is by means of the "shunt feed", whereby a region of high and low pressure is created in the filter inlet main through a weighted check valve or Venturi tube, resulting in a definite proportion of the total flow of incoming water being shunted through a sealed cast-iron container, the so-called "alum pot" into which a quantity of the coagulant, potash or ammonium alum, has been placed. The concentrated solution thus formed is returned to the region of low pressure through a needle control valve. Owing to the fact that the potash and ammonium alums are less soluble than aluminium sulphate, and that comparatively small amounts of coagulant are required as compared with those required by large filtration systems, and further as large amounts of a less concentrated solution are more accurately controlled than small amounts of one that is highly concentrated, the former are the coagulants employed in the treatment of pool water by the "shunt feed" method. Most feeders of this type are, however, handicapped by the fact that there are no visual means of determining at all times when the coagulant has been exhausted. Small piston pumps which inject solutions of standard strength into the inlet main overcome this handicap and, too, give more definite indication of the amount used. The quantity of solution injected is varied by simple adjustment of the stroke



Upper left—Chlorinator in close proximity to filter unit, with possibility of damage to former. Screening of chlorinator desirable. *Upper right*—Tiled ramp room from shower to pool room, with possible hazard of slipping on sloping runway. Note soap on ramp. *Middle*—Sunnyside Swimming Pool, operated by the Toronto Harbour Commission. *Lower left*—Water jet pool cleaner devised by Mr. D. B. Stock, Toronto Board of Education staff. *Lower right*—Scum gutter. Rounded corners are superior.

of the pumps. Shunt-feed systems employing the Venturi tube may also be improved as regards accuracy by the use of indicating meters which measure the rate of addition of the solution. This form of control is further extended in some instances to include a mercury column water flow indicator which shows the hourly rate of water flow pumped through the plant. Sodium carbonate and ammonium sulphate, the latter for the production of chloramine in conjunction with chlorine, are administered in the same way as coagulants.

Loss in head gauges is essential to enable the operator to determine when filter backwashing is necessary. This would appear to be so obvious as not to require mention. However, in some installations one gauge only and in others none at all is in evidence. Strainers placed before the circulating pump to retain hair, material from bathing suits, etc., are better when duplicated, as one may be cleaned and put into service without interfering with the operation of the system as a whole.

Another important accessory to operation is some means of cleaning the bottom and sides of the pool without emptying and running the water to waste, as solid material is always deposited to some extent and this must be removed. Suction cleaners are designed for this purpose and permanent connections are made from the pump suction to the pool side, or a separate pumping unit, equipped with the proper connections, is mounted on a movable carriage. Suction cleaners are quite costly, however, and it may be of interest to describe a simple piece of equipment devised by Mr. D. B. Stock, of the Toronto Board of Education staff, which is giving good results at the pool where it is in use.

The apparatus consists merely of a piece of brass pipe about 3′ in length, sealed at both ends and perforated with a single row of 1/8″ holes placed about 1″ apart. The pipe is attached at right angles to the end of a long pole and is provided with a hose connection. Four brass ferrules, fitting loosely over the pipe, make it possible for the equipment to move easily over the pool bottom. To operate, the pipe is placed in the pool, a stream of cold water turned on through the hose, and the apparatus moved slowly over the bottom, the water jets being directed against the sediment lying thereon. Owing to the difference in densities between the cold water employed and the relatively warm pool water, solid material is literally moved by virtue of the velocity of the water issuing from the jets with a minimum of disturbance, this motion being aided by the sloping floor, and is eventually washed towards the pool outlet. It is claimed that less time and labour are required than in the case of a suction cleaner, and that the cost of the apparatus is negligible.

Liquid chlorine equipment and containers have been developed to the stage where most hazards are minimized, but due consideration should be given to the toxic nature of the gas, and one should not overlook the remotest possibility of accident, particularly where installations are placed indoors, as the toxic effects of the gas are not confined to the immediate vicinity of the plant, but may affect large areas. For this reason, provision should be made to house the equipment in gasproof chambers, providing ample exhaust ventilation sufficient to remove the gas to a point where it will not endanger life, should an emergency arise. In Toronto it is the practice to acquaint the Fire Department of the location of all gaseous chlorine equipment at swimming pools; firemen may then familiarize themselves with all details necessary for quick action in case of accident or fire.

Testing outfits for determining the correct amount of residual chlorine to maintain in the pool water are of considerable assistance to the operator and where sodium carbonate is necessary to maintain sufficient alkalinity in the water, some form of pH comparator should also be supplied.

Arsenical Poisoning in a Construction Camp*

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IN the spring of 1932 the grasshoppers became a menace to the crops in Manitoba. The Department of Agriculture of the province decided to use, as a means of control, what is commonly called "poisoned bait". This consisted of sodium arsenate mixed with certain proportions of bran and sawdust, the preparation being spread in the areas in which the grasshopper eggs had been deposited during the previous summer and fall. Sodium arsenate was supplied without charge to the various municipalities in the province. The municipalities were responsible for the preparation of the bait at selected centres, usually using any available empty building for the purpose. The bait was then distributed to the farmers in the district who applied for it.

Shortly after the commencement of this program, reports were received by the Department of Health and Public Welfare that certain persons responsible for the mixing of bait and some others who were using it had developed arsenical dermatitis. Instructions were immediately issued through the Department of Agriculture stressing the precautions which should be taken by the individual in handling and scattering the bait and giving information in reference to the safe storing and transporting of the bait in order that untoward effects might be avoided. There did not appear to be any further ill effects from the preparation and use of this bait until this fall.

On October 9th word reached the Department to the effect that the men employed in a road construction camp situated some twelve miles from Winnipeg were sick and unable to work. The contractor in charge of the camp had sent the message.

The personnel of the camp, comprising twenty-eight men and the foreman, together with the cook and the cookee, occupied a building consisting of one-half of a curling rink with a dirt floor. The building had very little light and was heated by a single box-stove. The waiting room of the rink proper was used as a combined kitchen and dining room. This was well lighted and ventilated, had a common board floor, and was heated by the cook-stove.

Sleeping Quarters—The cook and cookee slept in one corner of the kitchen. The other employees slept in double-deck single bunks which had ample bed clothing. On the floor of the sleeping quarters there was from one-half to three-quarters of an inch of dry sawdust, and the air of the quarters was full of dust.

Sanitation—All garbage was stored in large metal containers and was called for daily, being used as food for hogs. Dish water and wash water were disposed of on the ground some distance from the camp. Outside privies of the earth-pit type were provided. These were badly in need of cleaning and were located some 300 feet distant from kitchen and dining room.

Water Supply—The water used for drinking purposes only was brought in tanks from the city of Winnipeg. Water for cooking and washing pur-

*Presented at the Fourth Annual Christmas Meeting of the Laboratory Section, Canadian Public Health Association, Toronto, December 31, 1935.

poses was obtained from two local deep drilled wells.

Food Supply, including Milk—The food supplies were kept on a raised platform in one corner of the sleeping quarters. The milk supply was secured from two sources, both being local dairymen who had producers' licenses.

INVESTIGATION OF ILLNESS AMONGST THE MEN

When the camp was visited at noon hour some eighteen of the twenty-five men were sitting around the sleeping-quarters or lying on their bunks apparently unfit for work. Interrogation revealed that the camp had opened on September 30, 1935, and that no illness had appeared until October 6th. At this date practically the whole camp developed nausea and vomiting, pains in the stomach, dysentery, headache, general weakness, and dryness of the throat. All the personnel had taken ill between October 6th and October 9th, which was the date of the investigation.

The general survey of the situation indicated that there did not appear to be any foods common to all, with the possible exception of sugar and salt. There had been no article of diet which might be considered as likely to cause the chain of symptoms given. In the course of the investigation it was learned that the premises which were used for sleeping-quarters had, for the past two summers, been used as a mixing station for grasshopper poison bait. Samples were secured of the dust on the floor of the building; of certain food articles such as salt, sugar, and milk; and of water from the two wells. The samples of water and milk were submitted to the Provincial Laboratory and the samples of dust and food were submitted to the National Testing Laboratories in Winnipeg.

A provisional diagnosis of arsenic poisoning was made and the camp premises were condemned. Instructions were issued to move the men, together with kitchen and dining room, into tents at a new location.

Reports on the water and milk samples proved negative. Reports on the other samples were as follows:

Dust: Sample no. 7935 showed 0.4 mg. of arsenic per gram of dust.

Sugar and salt: Sample no. 7952 of sugar and sample no. 7953 of salt were found to be free of arsenic

With the report on the above samples, instructions were issued to the doctor in charge of the camp to obtain specimens of urine from as many as possible of those who were sick. Seven specimens were obtained and were submitted to the National Testing Laboratories. The results of these tests are presented in the following table:

TABLE I

ARSENIC IN URINE SPECIMENS

Sample	*No.*	*Arsenic Content per 100 cc. of Urine*
1	7983	0.8 mg.
2	7939	1.5 "
3	7940	1.2 "
4	7941	0.24 "
5	7942	1.2 "
6	7943	0.12 "
7	7968	0.16 "

A private physician who was treating one of the sick men submitted also a specimen of stomach contents and washings. This sample was found to contain a distinct trace of arsenic.

The camp has been under supervision since that time. On November 13th a check-up on the men employed during and since the time of the outbreak was made. It was found that of those employed between October 1st and 15th all had returned to work with the exception of four. Two of these had been laid off due to a reduction in the number of employees, one claimed that he was unable to work, and one was quarantined for scarlet fever. The diagnosis in the latter case was probably in error as it was made approximately at the same time as the outbreak took place and the man was transferred to the isolation hospital before there was any idea of arsenic poisoning. When reviewed

last November, the only apparent result was that one man had serious loss of vision amounting to almost total blindness in one eye and fifty per cent reduction in the other eye due to arsenical neuritis of the optic nerves.

In view of the fact that there are probably between two and three hundred buildings throughout the province of Manitoba which have been used as mixing stations for grasshopper poison bait, an order was immediately issued to all municipalities and all health officers condemning such premises, whether municipally or privately owned, for living purposes by any person or persons. Reviewing the claims made by a number of the employees who were ill, the Workmen's Compensation Board has recently ruled that the condition is one for which compensation will be paid.

TUBERCULOUS INFECTION OF CHILDREN AND OF ADULTS

WITHIN the same period [since 1882], information, gradually accumulated by pathologists, has shown that the tuberculosis of infants and young children differs conspicuously from that of adolescents and adults. . . . First infection with tuberculosis should not be regarded as an isolated lesion at the site of invasion of the tubercle bacillus but as a progressive disease that pursues a characteristic course. . . . There is (1) tuberculous pneumonia and tubercle-formation of greater or less extent in some part of the lung, not more frequently in the apex than elsewhere (an exception to this statement will be cited); (2) implication of the adjacent lymph nodes, often with progressive enlargement and massive caseation of these structures; (3) dissemination of tubercle bacilli by way of the blood-stream, with tuberculosis of distant organs, as of spleen, liver, meninges, and (4) in many instances death with generalized miliary tuberculosis. Infection may enter the body by way of the gastro-intestinal tract, usually in infants or young children, and in these instances pursues a course analogous to that outlined above.

Tuberculosis of adult type is almost invariably a disease of different character, that begins in the lungs and here produces the changes by which it is recognized: (1) It begins in the upper part of the upper lobes doubtless because the peculiar position and conformation of the adult chest and the associated physiology of respiration make these the most susceptible parts of the lungs. (2) Its tendency to remain localized in the lung, and often in the apices of the lungs, is its outstanding feature. (3) The adjacent lymph nodes show scant involvement and the gross caseation of these structures, characteristic of tuberculosis of first infection, is wanting. (4) Dissemination by way of the blood-stream is absent or inconspicuous, and miliary tuberculosis following penetration of a caseous lesion into contact with the circulating blood is an unusual and late event. (5) The disease progresses, in large part at least, by way of the bronchi from one part of the organ to another, and ultimately by way of these structures may reach the trachea, larynx and intestine. (6) The disease often pursues a chronic course and is associated with cavity-formation and fibrosis. We may justly assume that the localization of the disease in the lung is referable to the immunity conferred by a first infection, and its tendency to pursue a chronic course with fibrosis may be similarly explained.—*Eugene L. Opie: Present Concepts of Tuberculous Infection and Disease, Am. Rev. Tuberc.*, **32**:*617, 1935.*

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THE PRESENT PROBLEM IN SCARLET FEVER

DURING the last fifty years the death rate from scarlet fever in Canada has shown a striking and continuous decline. This reduction in mortality appears to be largely due to a change in the clinical character of the disease. Fatal cases are now relatively few in comparison with the number recorded in the earlier years. Scarlet fever morbidity, on the other hand, has not declined. In spite of this favourable situation in regard to mortality, the disease is endemic, and serious epidemics periodically occur in all the provinces. The present situation in scarlet fever, therefore, indicates that our efforts at control are ineffective. The menace to health of this disease can by no means be measured by the mortality or even by the number of reported cases. Experience at the Riverdale Isolation Hospital, Toronto, as reported by Dr. Beverley Hannah,* indicates that of a series of 3,670 cases 38.5 per cent had one or more complications. Of all cases, 11.3 per cent developed otitis media and 2.6 per cent mastoiditis.

The insidious effects of the disease, the ultimate influence of which we know but little, and its characteristic and disabling complications, make the solution of the scarlet fever problem an immediate need. In the thirteen years which have elapsed since the fundamental contributions to our knowledge of the etiology were made by Doctors Gladys and George Dick, and Doctor A. R. Dochez, certain facts have been clearly recognized.

It is agreed that haemolytic streptococci are the cause of the disease, and it is generally considered that these are indistinguishable from the strains of haemolytic streptococci isolated from cases of erysipelas and puerperal sepsis. It was early shown that the filtrates of cultures of haemolytic streptococcus are toxic and that in suitable dilution specific skin reactions are elicited in susceptible individuals, practical use of this observation having been made in the Dick test. The value of this test in identifying susceptible individuals and in determining the response of such persons to methods of active immunization has been established. In scarlet fever therapy the use of specific antitoxin has been found of definite value, particularly in toxic cases. On the whole there is an agree-

*Personal communication.

ment that the use of antitoxin reduces the incidence of complications in the course of the disease and its use is recommended by clinicians with extensive experience gained in isolation hospital practice. It has been demonstrated that a satisfactory degree of immunity can be produced in individuals by the administration of scarlet fever toxin but, in order to obviate severe reactions in susceptible individuals, it is necessary to employ a series of five carefully graded doses. Using the present method in Canada probably seventy per cent are immunized as judged by Dick testing; this percentage may be considerably increased by repeating the fifth dose. Experimental studies indicate that scarlet fever toxoid may produce a satisfactory degree of immunity without eliciting marked reactions.

It is evident that the community control of scarlet fever can only be accomplished, as in diphtheria, by widespread active immunization of the population. Past experience with such measures as isolation of cases, quarantine of contacts, and specific antitoxin therapy proves this conclusively. Much can be done in every community by the practising physician immunizing the children of the families who are under his care against scarlet fever as well as against smallpox and diphtheria. It is here that the present method can be most satisfactorily employed. Supplementing the work of private physicians a number of municipalities, in spite of the labour involved, have in addition provided facilities for active immunization against this disease as well as against diphtheria and smallpox. In such municipalities the records over a period of years indicate gratifying results.

THE HEALTH LEAGUE OF CANADA

THE recent inauguration of the Health League of Canada, which replaces the Canadian Social Hygiene Council, marks a further and highly important step in the development of social hygiene as conceived by Dr. Gordon Bates, who, as the pioneer in Canada in the movement for the control of venereal diseases, has for more than twenty years studied the problems of the so-called social diseases from every angle.

It is interesting to recall the evolution of the present movement. In 1919 Dr. Bates was instrumental in bringing the subject of venereal disease to the attention of the Dominion Government and the provinces of Canada. As a result, a practical and effective plan of co-operation was introduced involving direct financial aid on the part of the Dominion Government to the provinces in a program of control. There was established also the Canadian National Council for Combating Venereal Diseases. In developing the program of the Council, however, there was apparent a reluctance on the part of many lay persons to become identified with its work, not because of a lack of appreciation of the need and of the problem, but because of the general reticence which has always surrounded discussion of the subject. It was soon obvious that the problems of venereal disease control and of eliminating this scourge as far as possible are inextricably intermingled with other mental, moral, social and physical

health questions. Satisfactory progress against venereal disease was not possible, beyond a certain point, without attention to these allied problems. The direct attack on venereal disease, therefore, led gradually but inevitably into the wider field of general social hygiene. With such a conception, the name Canadian Social Hygiene Council was adopted in 1923.

As the years passed, Dr. Bates, as General Director of the movement, has become convinced that the control of venereal diseases in any community can be achieved only in proportion to the general interest of the community in health matters and in the work of the health department. By focusing attention on the striking achievements of local health departments, as in diphtheria control, or by arousing the community to a sense of its danger when, for instance, unpasteurized milk is supplied, the recently-formed Health League believes that added support will be given to local departments, making possible a general advance in the application of preventive medicine.

The progress of the Health League of Canada will be followed with keen interest by all who are interested in the furtherance of public health in Canada.

THE ANNUAL MEETING OF THE ONTARIO HEALTH OFFICERS' ASSOCIATION

THE first meeting of the organization now known as the Ontario Health Officers' Association was held in Toronto in October, 1886. It is of interest to recall its origin. Prior to 1884 local boards of health in Ontario did not exist, although provision had been made in the first Public Health Act in 1873 to require the appointment of such boards when serious epidemics threatened. Under the highly effective leadership of the late Dr. Peter H. Bryce the Act of 1884 resulted within a year of its passing in the appointment of more than four hundred boards of health. The devastating epidemic of smallpox in the province of Quebec in the following year, in which over 7,000 deaths occurred, acted as a powerful stimulus to the organization of public health in Ontario. In developing this organization Dr. Bryce recognized the basic importance of all that is implied in health education. A monthly health bulletin was issued to all local departments of health, to hospitals, and to the newspapers throughout the province. Reference was made frequently in the bulletin to the need of a conference of medical officers of health which would give the opportunity for instruction and discussion. It was with the same objectives and recognizing the same needs that in 1912 the Association, as at present constituted, was established and definite enactment made requiring the attendance of medical officers of health at this annual conference.

The program as published in this issue indicates that an important change in the form of the meeting has been introduced this year which will further advance the fundamental purposes of the meeting and permit of the more effective presentation of the recent contributions to our knowledge as relating to a number of problems of the local medical officer of health.

LETTER FROM GREAT BRITAIN

GEORGE F. BUCHAN, M.D., F.R.C.P., D.P.H.
London

The Health of the School Child

THE Annual Report of the Chief Medical Officer of the Board of Education for the year 1934 is the first presented by Dr. Arthur S. MacNalty who recently succeeded Sir George Newman as Chief Medical Officer to the Board of Education.

The School Medical Service, he states, is designed to improve the health conditions, both personal and in regard to environment, of the children of the nation, and to endeavour to secure the physical improvement, and as a natural corollary, the mental and moral improvement of coming generations.

October 1st, 1934, was a red letter day in school hygiene. On that day came into force the Milk Scheme for supplying school children with milk at a halfpenny instead of a penny for one-third of a pint as part of the Government's policy for the utilization of surplus milk. The number of children in public elementary schools receiving a daily ration of milk under voluntary arrangements was 800,000 in 1931 and 900,000 in 1933 but under the milk-in-schools scheme the number increased to 2,650,000 in a few months.

In 1934, out of more than one and three quarter millions of children examined at routine medical inspection, 12.0 per thousand were found to be malnourished and requiring treatment and 14.0 per thousand were found to be under-nourished and requiring observation. The figures for "malnourished" children were 11.1 per thousand in 1933 and 10.7 per thousand for 1932. The massed return, however, from 316 Local Education Authorities for 1934 shows that the condition of nutrition of school children in England and Wales remains practically stationary and shows no general deterioration.

Progress has been made in all directions in physical training in the elementary schools. The quality of the actual instruction has improved steadily. It is disappointing to find that only 122 Local Education Authorities employ organizers of physical training in spite of the fact that efficiency can be assured only by their guidance and supervision.

The Report deals in some detail with the Ophthalmic Service. All Local Education Authorities with one exception have established ophthalmic schemes for the treatment of children with eye defects. Information concerning children under five with severe eye defects should be notified to the Education Authority prior to admission to school. The system of school medical inspection is the chief means of ascertainment of eye defects in children of school age. The co-operation of teachers is essential, as they are in constant touch with the children and can report any signs indicative of a special sense defect. There are two defects in the scheme of ascertainment. The first is that children are not tested for visual acuity until they are eight and the second is that the visual acuity test does not necessarily detect all children who are in need of treatment or ophthalmic supervision. This can be overcome in part by the use of the E Chart for illiterate children but the results are unreliable unless carried out by an expert. Another method is for the nurse to test the vision of children who have learnt to recognize letters, *i.e.*, children between the ages of 6 and 7. This procedure is carried out in certain areas with some success. One school medical officer reports

that out of 305 children of this group so tested 35 were found to require treatment, whilst 10 required to be kept under observation. The only method of completely overcoming both defects in the system of ascertainment would be to examine by refraction every child on admission to school. The principal activities of the School Medical Service relative to the examination and treatment of eye conditions are those of the examination and treatment of defective vision, squint, eye diseases, the selection, treatment and supervision of "partially sighted" and "blind" children and the testing of colour vision. The supply of spectacles is most satisfactorily carried out by contract between the Local Education Authority and a local optician, a representative of whom attends the clinic during refractions to measure and fit frames. This enables the medical officer or ophthalmic surgeon to check the glasses before issue to the children.

A system of "following up" is essential to ensure that children attend for treatment or observation. The co-operation of the teacher is useful to see that glasses are worn as ordered. No ophthalmic scheme is complete without arrangements for the treatment of squint and for exercises in fusion training. These arrangements must extend to children under school age when the chances of obtaining satisfactory results are more promising. Facilities for the treatment of eye defects should be granted to pupils in secondary schools and this has been done by the majority of Higher Education Authorities.

An increasing number of Local Education Authorities have made provision for the treatment of children suffering from stammering and other speech defects. In 1934 50 Authorities provided classes. Of these, 40 Authorities provide classes which children attended for 50 minutes twice a week and 10 Authorities classes where full time attendance was arranged. Following up after a period of training in the class is important, for recurrence is always possible.

After a period of 28 years it can be recorded how successful the open air school movement has proved. At the end of March, 1935, there were in England and Wales 94 day and 52 residential open air schools, accommodating in all 14,705 children. In addition there were 37 sanatorium schools and 66 hospital and convalescent cripple schools built on open air lines.

In 1935 the Board of Education for the first time officially recognized expenditure on child guidance to rank for grant as part of the provision of the school medical service and established the principle that a Local Education Authority may contribute to voluntary child guidance clinics for services rendered to children referred by the school medical officer.

MENTAL HYGIENE

THE provisions of the Mental Treatment Act, 1930, relating to Voluntary Patients, enable any person who voluntarily desires to submit himself to treatment for mental illness, to be received without a reception order as a voluntary patient into an institution, nursing home, or other place approved for such a purpose by the Board of Control. The patient has to make a written application to the person in charge, but if he is under 16 and his parents or guardian desire him to receive treatment for mental illness, it is for them to make the written application. In this case the application has to be accompanied by a medical recommendation, signed either by the usual medical attendant, or by a doctor approved for the purpose by the Board of Control or by the local authority within whose area the patient then is, stating that he is likely to be benefited by being received as a voluntary patient. The recommendation must be signed within 14 days of the medical examination being made. A voluntary patient may leave the institution, nursing home, or approved place upon 72 hours' notice in writing being given

to the person in charge by the patient himself or by the parent or guardian if he is under 16. Notice of the reception, death or departure of a voluntary patient has to be sent by the person in charge of the institution, etc., to the Board of Control. Should the patient become incapable of expressing his willingness or unwillingness to continue to receive treatment, he must not be retained as a voluntary patient for longer than 28 days unless his power of volition returns. The Act gives power for Commissioners of the Board of Control to visit the patient at any time and report to the Board.

It is of interest to note that the Ontario Mental Hospitals Act 1935 makes similar provision for mentally ill persons to be admitted to mental hospitals as voluntary patients upon the application of the patients themselves and that it gives power to the Minister of Health to establish diagnostic and out-patient clinics for patients suffering from mental illness. In England power is given to local authorities to establish clinics for diagnosis and out-patient treatment of mentally ill persons under the Mental Treatment Act of 1930.

The experience which has been gained of these voluntary provisions since they became available shows that first of all patients submit themselves for treatment at a definitely earlier stage of their illness; secondly, the voluntary patient avoids the added stress which the knowledge of the compulsory taking away of his liberty entails; and thirdly, under this Act a certain type of neurotic patient can be catered for in the mental hospital who could not previously be admitted for treatment.

At a Conference on Mental Welfare held in London recently, Dr. Davies-Jones, Medical Superintendent of the Isle of Wight County Mental Hospital, discussed the difficulties he had encountered in the administration of the voluntary provisions of the Mental Treatment Act, 1930. He had not always found it wise to enforce the provision that a full 72 hours' notice be given by the patient of his intention to leave where circumstances indicated that immediate departure would be in his proper interests. He regretted that a "Medical Statement" upon the newly admitted patient is not required by the Board of Control. It is desirable that mental hospitals should approximate to ordinary hospitals, and that, therefore, certain statutory requirements such as the surprise visits of the Commissioners of the Board of Control should be abolished, and notified visits take their place as these would result in useful discussions of points.

The difficulties connected with the applicant are many. Admission must not be sought by the applicant to oblige some harassed relative and the use of undue persuasion to secure admission was strongly to be deprecated. False views may be dispelled by showing the accommodation offered and refusing to guarantee prolonged sojourn in any one ward, as transfer to another may be necessary for treatment. With regard to the types of cases suitable for voluntary patients, as long as the applicant realizes the existence of mental illness and as a result desires treatment upon a voluntary basis, he should be accepted. The Voluntary Provisions of the Act should be used whenever possible to avoid certification and the applicant can be admitted again and again if necessary as in cases of manic-depressive psychosis.

The old ideas of restraint associated with "Asylums" must go and parole to suitable types of case should increase. Treatment aims at return to the outside world and not to a penal settlement. The attitude to all voluntary patients should be one of firm assurance that it is as easy to get out of the mental hospital as it was to enter it. When considered desirable the "pros and cons" should be discussed if the patient desires to leave before advised to do so by the Medical Officer. Parole is not granted

to all voluntary patients as it is a therapeutic measure.

Further, with regard to difficulties relating to the general practitioners, this used to lie in the tendency to submit all and sundry as voluntary patients. Now that a better grasp of these provisions of the Act has been gained, these difficulties have abated.

Experience has shown that all voluntary patients should pass through the out-patient clinic; secondly, that social and mental welfare work is essential in connection with these patients; thirdly, that an increase in the medical staff at the mental hospitals is essential, and fourthly, that there appears to be an increasing need for the accommodation for treatment of juvenile voluntary patients under sixteen years of age.

HEALTH EDUCATION

THE Eighth Annual Conference on Health Education, organized by the Central Council for Health Education, held in London on November 21st, 1935, was opened by Dr. A. Salusbury MacNalty (Chief Medical Officer, Ministry of Health and Board of Education). Dr. MacNalty pointed out that the subject "Health Education in Schools" was a far reaching one for there is a wide diversity of schools. One thing, however, was clear—that the study and practice of health should from the first form part of the everyday life and education of the scholars. Hygiene in the school must be a training in habit, a discipline as well as a culture, concerned directly with the life of the child, his family and the community. Much of the teaching of hygiene in the elementary school must be indirect and given as an integral part of school life. For children between seven and eleven years of age the formation of right habits was the chief requirement in the teaching of hygiene. For children over eleven, instruction in elementary physiology and hygiene, developing out of the lessons in biology, is desirable. It falls under three heads: personal hygiene, hygiene of the home, and general hygiene (public health). For girls it should also include mothercraft.

The Right Hon. Sir Kingsley Wood, P.C., M.P. (Minister of Health), took the chair during the afternoon session. In his address he said that what we wanted was to make a combined effort to raise still further the general standard of the health of the nation and especially that of the younger generation. The younger generation are rightly demanding more and better opportunities for a healthier life, for physical training and health exercises. The new generation are learning more and more the art of living. Many young men and women to-day appreciate the value of fresh air, exercises, rest and cleanliness and speaking of the nation as a whole, he thought that we have now a greater understanding of the needs of the body. There are many facts that show that our high health standard of recent years is being well maintained and there are from all parts of the community a demand for an open air life. Undoubtedly one of the best signs of the time is the increasing provision for playing fields and swimming baths. Last year loans totalling well over £2,000,000 were sanctioned for these purposes alone by his Department. Our aim, he said, must be and should be that every child should receive the best training of mind, of hand, of eye and of body from which he is capable of profiting. We should not relax our efforts in all those connections when school time comes to an end. In climbing the educational ladder, we should, at any rate, do our best to see that the young man or the young woman has, in the first place, the physical stamina to climb it.

PUBLIC HEALTH EDUCATION

A TUBERCULOSIS EXHIBIT IN VANCOUVER, B.C.

THE exhibit shown in the illustration has been part of an anti-tuberculosis campaign conducted in Vancouver, B.C. The plan was to show it in store windows throughout the city, moving it approximately once a week until all parts of the city had been covered. No difficulty was experienced in getting suitable windows for the exhibit.

The display endeavours to place before the public certain fundamental ideas on tuberculosis control. At the top may be seen the emblem of the anti-tuberculosis crusade. This is outlined in Neon tubing, which adds greatly to the effectiveness. The two side panels are detachable and hinged to facilitate moving and permit of adjusting to windows of various sizes. The panels carry two slogans, *Tuberculosis is Curable* and *Tuberculosis is Preventable*. A few of the early symptoms are given on one panel and the allies which aid in good health are named on the other.

The other posters attempt to portray the importance of covering the mouth when coughing and sneezing; periodic health examination; the value of the tuberculin test, especially in childhood; the advisability of seeking advice from the family physician; the dangers of spitting; and the importance of having everyone in the community join in the anti-tuberculosis campaign.

The feature of the large middle panel is the moving sign reading *Tuberculosis is your greatest controllable community health problem; join in the fight*. Beneath this are two radiographs depicting normal lungs and tuberculous lungs. These are suitably illuminated, using an on-and-off flasher.

A mannequin was placed on each side of the exhibit, one dressed as a hospital nurse, in white, and the other as a district nurse, in dark blue.—*W. H. Hatfield, M.D., Director of Tuberculosis, Provincial Board of Health, British Columbia; Medical Director, Vancouver Public Health Institute for Diseases of the Chest, Vancouver General Hospital.*

PLANS, PROGRAMS, AND PROGRESS

Scarlet Fever Immunization in Oshawa, Ontario

WHAT do we expect, what should we expect, and what do we get? In all protective measures we aim at life-long immunity, and rightly so. Nature produces that immunity through an attack of the disease, or through indefinitely repeated, subminimal infections. Can we expect a short series of small doses of scarlet fever toxin to accomplish as much?

Scarlet fever is particularly a disease of the early age group, the herd age, when children tend to herd together, either in play or in school. This is the age in which their resistance to infection has not been built up by subminimal infections, and therefore the age in which protection is needed most. And this is particularly true of the preschool group. If we can furnish reasonable protection during this period, we are accomplishing something worth while.

The population of Oshawa was 12,246 in 1920 and steadily increased to 25,500 in 1929, but by 1935 it had fallen to 24,120. In 1920 our morbidity rate for scarlet fever was 6.6 per thousand of population and during the next five years averaged from 3.4 to 4.1. In 1926 it increased to 6.8. Oshawa is fortunate in having as Medical Officer of Health Dr. T. W. G. McKay, who is keenly interested in preventive work and, through his efforts, a campaign for immunization of school children was started in that year. The first work was conducted using the old series of four doses, approximately a total of 8,000 skin test doses being given. In the following year, 1927, our morbidity rate fell to 5.4. At the same time immunization of preschool children was undertaken. The following year, 1928, showed a marked drop, with a rate of 2.9 per thousand. In *International Clinics*, volumes 3 and 4, 1934, Lawson Wilkins of Baltimore published an excellent article on "Immunization against the Contagious Diseases of Childhood", in which he called attention to the fact that immunization in preschool age lowers the morbidity rate markedly, more so than when immunization is confined to school age-groups.

In 1928 the present dosage, five injections totalling 18,630 skin test doses, was introduced. The incidence during the ensuing seven years is interesting. In 1929 the morbidity rate dropped to 0.8 per thousand, the lowest recorded in Oshawa. In this year the population reached its highest number. In 1930 scarlet fever incidence was further reduced, having a rate of 0.46. In 1931, however, the rate rose to 1.7 and in 1932 to 4.3 per thousand. In 1933 it dropped again to an extreme low of 0.35, and in 1934 rose again to approximately 2.1—53 cases in a population of 23,430. In 1935 the rate again fell being 0.9 per thousand.

The question is often asked, "How long does the immunity last?" There are not sufficient data on which to base a statement from our experience, but it is felt that our records indicate that the immunity, once established, lasts for at least six to seven years, if not longer. It is hoped that as the immunization work is continued, definite information on this important question may be made available.

Preschool Age Preferred

Since there is substantial evidence that the highest incidence of positive Dick tests occurs between the ages of two to five years and that immunization measures among preschool children definitely lower morbidity rates, the preschool age is the age of choice for immunization. In addition, there is less likelihood of reaction. I am convinced, therefore, that it is the duty of every practising physician to see that every child born under his

care is vaccinated against smallpox by three months, protected against diphtheria by one year, and immunized against scarlet fever before its second birthday.

Dick Testing

In our immunizing none of the children received a preliminary or a final Dick test. To Dick test all children would have required considerable time, and with limited personnel we preferred to reach the largest number. Furthermore, in performing the Dick test incorrect information may be obtained due to the technique being faulty, the injection being given too deeply, or the test toxin may have deteriorated, possibly having been stored too long or not stored in a refrigerator.

Results

It is, of course, realized that probably not more than 70 per cent of the children were satisfactorily immunized by the five doses of toxin administered. However, the immunity status of the whole group of children was effectively raised, as indicated by the results obtained. In the years 1931, 1932, and 1934, when our morbidity rate was comparatively high, 25 per cent of the cases reported had been previously "immunized", some receiving the original course of four doses. None of these suffered more than a mild attack, and there were none of the usual complications of scarlet fever. By the close of 1934, 4,079 children had been given the preventive treatment, using the series of five doses of toxin.

Doctors Gladys and George Dick and the Scarlet Fever Committee, recommend the following procedure for immunizing against scarlet fever: that five doses of 500, 2,000, 8,000, 25,000, and 80,000 skin test doses, respectively, be given at intervals of one week and followed in two weeks by a Dick test; if this is positive, a further dose of 100,000 skin test doses is recommended. Using such doses, about 21 per cent of the children show fever, 7 per cent a general rash, and 42-45 per cent local reactions. This dosage is in striking contrast to our use of much smaller doses in Canada, totalling 18,630 skin test doses. It must be remembered, however, that these small doses appear to be the largest which can be given without occasioning marked reactions. This was well shown by our results in which not more than 3 per cent evidenced any reaction, which reaction was seldom more than a feeling of malaise lasting for a few hours.

It is recommended that children exhibiting a positive Dick test after receiving five doses should be given a sixth injection, repeating the amount of the fifth dose. By this procedure the percentage immunized is increased and compares favourably with the results obtained in the United States with the large doses of toxin employed. As no Dick testing was conducted in our immunization program, five doses alone were used and therefore an even greater reduction of scarlet fever incidence would be expected in communities where it was possible to carry out complete Dick testing, with the administration of the sixth dose to those requiring it.—*Grant Berry, M.D., Oshawa, Ont.*

BRANTFORD, THE "NO DIPHTHERIA TOWN"

BRANTFORD for many years has held this proud title. To continue to keep Brantford free from diphtheria, Dr. W. L. Hutton, Medical Officer of Health, began his yearly immunization campaign in February by providing free immunization in every school. A letter was sent to all parents and guardians announcing February 12th as "Toxoid Day" in Brantford, when the first of the toxoid treatments was to be given for the benefit of all children over nine months and under eight years or age who had not previously had them. Parents were urged to bring preschool children to the nearest school for immunization. A total of 578 children were given the first inoculation. Dur-

ing the past fourteen years 12,597 children have received the treatment. Brantford is now in its sixth year without a single case of diphtheria among the children of the city. In his letter to parents, Dr. Hutton said: "Dr. Dafoe gave the toxoid treatment to the Dionne quintuplets; your baby is deserving of the same protection.

HEALTH OF INDIANS IN CANADA

ACCORDING to the annual report of the Hon. T. A. Crear, Minister of the Interior and Superintendent-General of Indian Affairs, Canada's Indian population has slowly increased from 104,894 in 1924 to 112,510 in 1934. During the past year the medical service to Indians on reservations has been extended by the appointment of a medical superintendent at Fort Good Hope in the lower Mackenzie River valley and a small hospital was erected at the Stony Indian Agency at Morley, Alberta. In connection with the Indian service the Department employs regularly or frequently some five hundred doctors and dentists and maintains several hospitals and a small field nursing service. It provides the care of sick Indians in about two hundred public hospitals. It engages, in fact, in every activity affecting the individual and community health of about 112,500 Indians living in some separate 800 separate communities.

PERSONALS

DR. A. GRANT FLEMING has been appointed Dean of the Faculty of Medicine of McGill University, succeeding Dr. Charles R. F. Martin, who recently retired. Dr. J. C. Simpson, Secretary of the Faculty, has been appointed to the newly-created post of Associate Dean. Dr. Fleming has been Professor of Public Health and Preventive Medicine since 1927 and is known throughout the continent as an outstanding leader in medicine.

Dr. J. G. FitzGerald, Director of the School of Hygiene and Connaught Laboratories, University of Toronto, recently delivered the Herzstein Lectures under the joint auspices of Stanford University and the University of California.

The Canadian Welfare Council recently announced the appointment of Miss Margaret F. H. Young, Reg.N., B.A.Sc., M.A., of Victoria, B.C., as Secretary of the Division of Maternal and Child Hygiene. Miss Young enters upon her new responsibilities qualified by high academic and valuable practical experience in British Columbia as a member of the Provincial Board of Health.

F. T. UNDERHILL, M.D., F.R.C.S., D.P.H.

THE many friends of the late Dr. F. T. Underhill of Vancouver will learn with deep regret of his death on February 17th. For twenty-six years he was medical officer of health of Vancouver, from which position he retired in 1930.

Dr. Underhill was born in Tippenden, Staffordshire, England, in 1860 and came to Canada in 1894, settling in British Columbia. He had the distinction of being one of the first full-time medical officers of health in Canada, having been appointed to office in Vancouver in 1904. Prior to that time he had served for seven years as city bacteriologist. By academic training he was particularly qualified for his work as health administrator, being a fellow of the Royal College of Surgeons of Edinburgh and holding also the Diploma in Public Health. He possessed a personality which assured the respect and confidence of the municipal authorities. Dr. Underhill had the privilege of laying the very foundations of the city department of health, guiding its progress and later enjoying to the full the fruits of his labours.

ASSOCIATION NEWS

The Week of Annual Meetings in Vancouver, June 22nd-27th

IN attempting to survey the program for the week of the annual meetings in Vancouver, one is impressed by the achievement of the Local Committee in co-ordinating the programs of four associations into one great public health week. It represents months of effort and planning and was made possible by the Vancouver Committee in extending an invitation to the Canadian Public Health Association more than two years ago. Step by step the plan was evolved whereby the Western Branch of the American Public Health Association, the Canadian Tuberculosis Association, and the State and Provincial Health Authorities of North America were also able to accept similar generous invitations. This is the first occasion on which the latter important body has met in Canada and its meeting is a tribute to the President, Dr. H. E. Young of Victoria, the dean of Canadian health officers. These associations are not meeting primarily as individual units, but through joint sessions have blended their interests into one impressive public health convention, continuing from Monday morning until Saturday, when the adjourned meeting of the associations in Vancouver will reassemble in Victoria. There are few cities on this continent where public health enthusiasm is greater than in Vancouver. The creation of a provincial health association bringing together medical officers of health, public health nurses, and all members of the health organization as well as interested practising physicians, is but one evidence of this very manifest interest in all matters relating to public health. The first meetings of this new provincial association, which will be affiliated with the Canadian Public Health Association, will be held during the convention week. Dr. G. F. Amyot has been unaminously named as President.

Vancouver will be a gala city, celebrating its Golden Jubilee. From April until September the city will be host to visitors, with programs including pageants portraying life during Canada's pioneer days and other specially arranged functions. Recognizing the significance of this Jubilee year in Vancouver, many national associations, including the Canadian Nurses' Association and the Canadian Medical Association, are planning to hold their meetings at the Coast.

Monday, June 22nd

The convention week will open with the sessions of the Canadian Tuberculosis Association. The day's program will relate particularly to the problems of tuberculosis control in British Columbia and the Pacific Coast. A visit will be made to the Vancouver Public Health Institute for Diseases of the Chest and a clinic will be conducted, as well as papers presented on the clinical aspects of tuberculosis. In the evening the dinner and annual meeting of the Canadian Tuberculosis Association will be held.

Meeting at the same time will be the State and Provincial Health Authorities of North America under the presidency of Dr. H. E. Young of Victoria. Sessions will be held both in the morning and the afternoon, with a dinner session in the evening.

Tuesday, June 23rd

Continuing its sessions, the Canadian Tuberculosis Association plans to present a series of papers on tuberculosis from the national standpoint. This program is being contributed to by a number of the leaders of the tuberculosis movement in the United States and Canada. At the close of the afternoon, a visit will be made to the

Preventorium, where tea will be served.

A public meeting is planned for Tuesday evening for the popular presentation of some of the recent advances in tuberculosis control. During the day the State and Provincial Health Authorities will continue their deliberations. The Executive Council of the Canadian Public Health Association will meet in the evening to formulate policy and program for the coming year.

Wednesday, June 24th

The remaining three days in Vancouver will provide joint sessions of the three associations already named and the Western Branch of the American Public Health Association, of which Dr. H. E. Young is President-Elect. An innovation for Canadian meetings is the breakfast session, a feature which has been appreciated at meetings of the American Public Health Association. At this session the Archbishop of British Columbia, the Rev. A. V. de Pencier, and Mayor G. G. McGeer of Vancouver will bring messages of welcome.

The first general session will be held during the morning. Addresses will be presented by Dr. W. F. Cogswell, President of the Western Branch of the American Public Health Association; Dr. H. E. Young, President of the State and Provincial Health Authorities of North America; Dr. J. W. McIntosh, President of the Canadian Public Health Association; and Dr. R. G. Ferguson, President of the Canadian Tuberculosis Association. A feature of the day's program will be the joint luncheon, when three addresses by outstanding leaders will be presented.

The Local Committee have provided several opportunities to visit centres of interest to the members of the convention. Of these, the visit to the Seymour Intake of Vancouver's water supply will be of special interest. Mr. E. A. Cleveland, Chairman of the Greater Vancouver Water District, is acting as host to the convention. In the course of the visit he will outline the unique features of Vancouver's water supply. Refreshments will be served and the visit will be one of the several social events during the week.

At 8 p.m. a public meeting will be held under the chairmanship of Dr. Reginald M. Atwater, Executive Secretary of the American Public Health Association. The Hon. D. Patullo, Premier of British Columbia, the Hon. Dr. G. Weir, Provincial Secretary and Minister of Health, and Dr. H. Farres of Saint John, N.B., will be the speakers.

Thursday, June 25th

The morning sessions will include a joint session of the associations and section meetings of the Canadian Public Health Association in vital statistics and in public health engineering. At the luncheon brief addresses will be given by representatives of the sections of the Canadian Public Health Association.

In the afternoon a general session will be held featuring the subjects of milk control and the venereal disease problem. Supper will be served at the Jericho Country Club and an evening program of unusual interest is being provided.

Friday, June 26th

In the morning programs will be provided by the Section of Vital Statistics and by the newly-formed British Columbia Health Association, which will meet jointly with the Section of Public Health Education of the Canadian Public Health Association under the chairmanship of Dr. G. F. Amyot. The Western Branch of the American Public Health Association will also provide a separate session.

Following the luncheon a joint session will be held for the discussion of tuberculosis, cancer, and diabetes. For those desiring the opportunity of visiting Vancouver's harbour, arrangements have been made for a tour of inspection during the afternoon.

The closing sessions of the Canadian Public Health Association and the Western Branch of the American Public Health Association will be held in the evening, at the close of which the members will embark for Victoria.

Saturday, June 27th

Provisional plans provide a brief session at the Parliament Buildings when welcome will be extended by the Lieutenant-Governor of British Columbia. A visit will be made to the far-famed Butchard Gardens. Those desiring to do so may visit the Dominion Government Quarantine Station at William Head. Further plans in connection with the visit to Victoria will be announced in the May issue of the JOURNAL.

Hotel Reservation and Transportation

It is urged that reservations be made as early as possible directly with the hotels. The headquarters of the meeting will be the Hotel Vancouver. Summer tourist rates will be in effect. Detailed announcement of railroad rates from centres in the United States and Canada will be made in the May issue.

CONFERENCE, SECTION OF VITAL STATISTICS, TORONTO, MAY 4TH AND 5TH

AS previously announced, the Section of Vital Statistics is calling a conference of its members in Toronto on May 4th and 5th for the discussion of the report of the Committee on the Certification of Causes of Death, particularly as the report relates to the revision of the International List of Causes of Death. In view of the fifth decennial revision of the List, the Committee has prepared recommendations as relating to this revision which, if approved by the Section, will be forwarded to the Dominion Bureau of Statistics in Ottawa for consideration.

Two sessions are planned, one on Monday afternoon and the other on Tuesday afternoon. The meetings will be held in the Royal York Hotel and a luncheon is planned for Tuesday, preceding the afternoon session. Meetings of the Committee will be held on Monday evening and Tuesday morning.

It is hoped that the conference will give the opportunity for the discussion of certain plans for new undertakings as well as the formal report of the Committee. The sessions will be of interest to medical referees and actuaries of the various life insurance companies as well as to those engaged in the registration of vital statistics.

THE STUDY COMMITTEE OF THE PUBLIC HEALTH NURSING SECTION

A STUDY Committee consisting of a small active group and a Dominion-wide representative consultant group has been appointed by the Public Health Nursing Section. Miss Laura Gamble has accepted the chairmanship of this committee.

While the committee was being organized, the officers of the Section made an effort to secure opinions from health workers throughout the Dominion concerning questions which should be studied as well as the order of their importance. The question receiving first place in the replies to the questionnaire sent out was "requirements for employment".

In any consideration of this question it seemed necessary to learn first what is the present practice in Canada with respect to the requirements for the employment of public health nurses, and the Committee is asking official and non-official as well as industrial and commercial firms for information regarding their employment policies for supervisors and staff nurses.

A report from this committee will be presented at the annual meeting.

Twenty-Second Annual Meeting

Ontario Health Officers' Association

TORONTO, May 13, 14 and 15, 1936

Headquarters: Royal York Hotel

THE program for this year's meeting will include general sessions on the afternoons of Wednesday and Thursday, May 13th and 14th. Friday afternoon will be devoted to field trips.

During the general sessions, subjects of general interest to the entire membership will be presented. Among the guest speakers from outside Ontario who it is anticipated will be present are the Honourable C. G. Power, Minister of Pensions and National Health, Ottawa; Dr. E. S. Godfrey, Jr., Assistant Commissioner for Local Health Administration, New York State Department of Health; and Dr. C. L. Scamman, Director, Division of Public Health, The Commonwealth Fund, New York City.

THE HONOURABLE J. ALBERT FAULKNER, M.D., Minister of Health, Ontario

A departure in the presentation of papers will be followed during the morning sessions of Thursday and Friday, May 14th and 15th, when it is planned to provide a series of informal addresses designed to give the medical officer of health practical help in the solution of the problems which appear to present most in the way of difficulty.

DR. A. E. RANNEY, Medical Officer of Health, North Bay; President, Ontario Health Officers' Association.

On Thursday morning problems in the control of venereal diseases in communities where facilities are available will be presented under the auspices of the Division of Preventable Diseases. This division will also discuss methods of active immunization against certain communicable diseases, particularly as relating to

municipalities where the medical officer of health conducts the program personally. Milk control, fumigation, and slaughter-house sanitation will be other important topics. On Friday morning the subjects of immunization, veneral disease control, and tuberculosis as conducted in municipalities where there are no facilities available, supplementing the discussions of Thursday morning, will form an important part of the program. Nuisances as a problem of the health officer, school sanitation, enteric diseases, and local health education programs are also included in the morning's program.

Friday afternoon is being made available for field trips, permitting medical officers of health to see at first-hand such phases of sanitation in which they may have a special interest. The visits provided include a water filtration plant, modern dairy plant, sewage treatment works, etc. There will also be an opportunity to visit the Provincial Laboratories in the Parliament Buildings.

Preliminary Program

(All Sessions on Daylight Saving Time)

WEDNESDAY, MAY 13th

Morning Session

9.00 a.m.—Registration.

10.30 a.m.—1. The Office of Medical Officer of Health in Ontario: Present Situation and Historical Background—Speaker to be announced.

2. Needs of the Medical Officer of Health:
   (a) As shown by correspondence in the files of the Department—Dr. J. T. Phair, Chief Medical Officer.
   (b) As shown by reports of committees appointed by the Ontario Health Officers' Association at various times—Speaker to be announced.

Afternoon Session, 2.15 p.m.

2.15 p.m.—Outline of Legislation in 1936 affecting the Status of the Medical Officer of Health in Ontario—The Honourable J. Albert Faulkner, Minister of Health, Ontario.

2.45 p.m.—Department Report on the Duties and Status of the Medical Officer of Health in Ontario—Dr. B. T. McGhie, Deputy Minister of Health.

3.15 p.m.—Title to be announced—Dr. E. S. Godfrey, Jr., Assistant Commissioner for Local Health Administration, New York State Department of Health.

3.45 p.m.—Title to be announced—Dr. C. L. Scamman, Director, Division of Public Health, The Commonwealth Fund, New York.

THURSDAY, MAY 14th

Morning Session, 9.30 a.m.

1. Problems in the Control of Venereal Disease in Communities where Facilities are Available—program under the auspices of the Division of Preventable Diseases.
2. Milk Control in Communities with a Pasteurized Supply—under the auspices of the Division of Sanitary Engineering.
3. (a) Fumigation; (b) Health Problems in Industry—under the auspices of the Division of Industrial Hygiene.

1. Milk Control in Communities with Raw Milk Supply—under the auspices of the Division of Sanitary Engineering.
2. Immunization Program in Communities where the Medical Officer of Health is the Sole Agent—under the auspices of the Division of Preventable Diseases.
3. Slaughter-Houses—under the auspices of the Division of Sanitary Engineering.

Afternoon Session, 2.15 p.m.

2.15 p.m.—The Local Board of Health as its own Publicity Agent—Dr. D. V. Currey, Medical Officer of Health, St. Catharines, Ontario.

2.45 p.m.—Can We Prevent Heart Disease?—Dr. John Hepburn, Toronto.

3.15 p.m.—Serum Therapy in Pneumonia—Dr. George Anglin, Toronto.

3.45 p.m.—Title to be announced—Dr. A. R. Dafoe, Medical Officer of Health, Callander.

Dinner Session, 6.30

1. Presidential Address—Dr. A. E. Ranney, Medical Officer of Health, North Bay.
2. Guest Speaker—The Honourable C. G. Power, Minister of Pensions and National Health, Ottawa.

FRIDAY, MAY 15th

Morning Session, 9.30 a.m.

1. Nuisances as a Problem of the Medical Officer of Health—under the auspices of the Division of Sanitary Engineering.
2. Immunization Program in Communities where Help is Available to the Medical Officer of Health—under the auspices of the Division of Preventable Diseases.
3. Tuberculosis Problems in Communities where Facilities are Available—under the auspices of the Division of Tuberculosis Prevention.
4. Departmental Assistance to the Medical Officer of Health in the Local Health Education Program—Director, Division of Health Education.

1. Tuberculosis Problems in Communities where no Facilities are Available—under the auspices of the Division of Tuberculosis Prevention.
2. School Sanitation—under the auspices of the Division of Sanitary Engineering.
3. Enteric Diseases—under the auspices of the Division of Preventable Diseases.
4. Venereal Disease Problems in Communities where Facilities are not Available—under the auspices of the Division of Preventable Diseases.

Luncheon Session, 12.30 p.m.

Summary: The 1936 Convention as an Effort to assist the Medical Officer of Health in Meeting the Demands of His Office—Dr. J. T. Phair, Chief Medical Officer.

Afternoon Session, 2.30—Field Trips

Provincial Laboratories, Parliament Buildings.

Water Filtration Plant.

Modern Dairy Plant.

Sewage Treatment Works, etc.

BOOKS AND REPORTS

Injury and Incapacity. *By H. Ernest Griffiths, M.D., F.R.C.S. Published by the Macmillans in Canada, at St. Martin's House, 70 Bond Street, Toronto, 1935. 270 pages. Price, $3.75.*

Injury and Incapacity is a reference book for medical practitioners and those concerned with industrial insurance and compensation cases. The scope of the work is to establish a basis of estimating the probable period of incapacity for any given injury in any particular patient, having regard to his present employment and his ability to earn in any other employment.

Part I deals with the disability following injuries of the various regions of the body and also considers the average period of incapacity from work according to age and type of work. Each region of the body is taken up in detail and the various types of injuries in these regions are considered with relation of symptoms to the injury and to resulting disability.

Part II deals with the physical requirements of the workman. A series of physical types, twenty-four in number, has been described. In each of these types a definite anatomical and, sometimes, physiological standard essential to the workman has been outlined. There is a wealth of unusual information here which is completed by a comprehensive alphabetical list of occupations with reference number relating to the physical types described. From these one can judge the fitness of the applicant for the job under consideration.

The work has been compiled from a large personal practice and the review and analysis of 50,000 consecutive compensation and insurance cases. It will be found extremely useful both for the industrial surgeon and for the medical witness.

Robert E. Gaby

Tropical Medicine. *By Sir Leonard Rogers and Sir John W. D. Megaw. Second edition. Published by J. & A. Churchill, Ltd., 40 Gloucester Place, Portman Square, London W. 1, 1935. 2 coloured plates, 82 figures, 547 pages. Price 15s.*

When two distinguished clinical teachers such as Sir Leonard Rogers and Sir John Megaw combine their experience of tropical medicine, one may be assured of authoritative information. This book is divided into 25 chapters classifying the various diseases into unusually logical groups and dealing with the epidemiology, pathology, diagnosis, treatment and prognosis of the respective diseases. The volume has been designed to provide an economical and ready source of reference for the general practitioner who has very limited laboratory facilities at his command and thus is compelled to base his diagnoses upon clinical observations to a greater degree than is often the habit where well equipped clinical laboratories share this responsibility. The last three chapters concerned with the incidence of general diseases in the tropics, the microscope and general remarks on the diagnosis of fevers and case-taking provide a most fitting conclusion to this essentially clinical manual. There is a brevity and crispness to the contents of this book that permits the inclusion of more material facts than are often found in a volume twice its size.

Unfortunately the title of this very valuable manual may convey the impression to practitioners of clinical and preventive medicine in this country that it is not of local interest and therefore not necessary for their reference. Although there are certain diseases that are indigenous to the tropics, others that were once of world-wide concern have, as a result of chance and international public health effort, been confined to the more

primitive areas, with which the tropics are replete, and thus have come to be considered solely of tropical incidence. Furthermore in these days of tourist migration by land, sea and air, our contact with the tropics and their diseases has increased to such a degree that the physician should keep abreast with the whole field of his art.

Although the authors' experience is perforce largely drawn from India, the few other tropical diseases not found in that Empire are dealt with adequately. This second edition, which has of necessity involved partial revision due to the advances in this field of medicine over the past five years since the first edition, should be on the bookshelf of every practitioner in Canada who will admit his ignorance of those conditions that in so many instances are miscalled Tropical Diseases.

P. A. T. Sneath

Diet and Physical Efficiency. *By Howard W. Haggard, M.D., and Leon A. Greenberg, Ph.D., of the Department of Applied Physiology, Yale University. Published by the Yale University Press, New Haven, Conn., 1935. 180 pages. Price $3.00.*

This is a well-written, excellently printed volume. Brevity and freedom from extraneous material are among its merits. Furthermore, the exposition is so clear that the book must surely be intelligible to persons unacquainted with nutrition. This book, however, has one particularly valuable characteristic—it presents a new viewpoint. The authors recognized that most people on this continent eat three meals a day because of convention and convenience. They sought to ascertain whether there was any scientific method for deciding the optimal number of meals per day and they arrived at the conclusion that the productivity of factory operators may be increased by ten per cent by consuming the same quantity of food in five meals in place of three in a day.

Measurements of muscular efficiency made on a bicycle ergometer showed that it was low before breakfast, rose promptly after that meal, declined before lunch, and behaved after that meal as after breakfast. A regimen of three meals per day gives two peaks of muscular efficiency; only one is seen if breakfast is not eaten. Between the muscular efficiency and the amount of sugar in the blood there is fairly good agreement. The authors claim that there is also good agreement between efficiency and the values for respiratory quotient. In this regard the reviewer feels that the authors are on uncertain ground. They state that it is possible to deduce from the respiratory quotient the kind of fuel being burned. Ten years ago this deduction was generally accepted but considerably less faith in it is felt to-day. However, Haggard and Greenberg conclude, as have others, that men are more efficient when they are burning more carbohydrate than fat, and this they believe to occur for an interval after each meal. It was logical, then, to study the productivity of factory workers consuming two, three, four or five meals per day. The results showed that the use of five meals a day gave an efficiency greater than was experienced after fewer meals.

This is an arresting conclusion and several precautions emphasized by the authors should be mentioned. The total amount of food should not be increased. The extra meals should be carefully chosen so that the diet is not unbalanced. Further studies along these lines should be, and undoubtedly will be, made. Several objections may be offered. Factory executives will hesitate to introduce two additional meal periods. Let us assume, however, that these are very short, ten minutes each for example. Twenty minutes taken from an eight-hour day for two extra meals reduces the total production by four per cent, and this decreases the claimed gain in production from ten to six per cent. These and other objections do not lessen the conviction of the reviewer that the authors are to be heartily congratulated for introducing an important new viewpoint in dietetics.

E. W. McHenry.

CURRENT HEALTH LITERATURE

These abstracts are intended to direct attention to articles that have appeared in other journals during the past month. Any of the journals referred to may be borrowed for three days or longer if desired. Address requests to the secretary of the Editorial Board.

Frequency of Tuberculous Infection amongst Nurses

In this work the author observed 250 nurses who were reported to be in good health when they came on duty. Of those who were on duty with tuberculous patients, 16 per cent contracted some form of pulmonary tuberculosis, whereas of those not nursing tuberculous cases only one per cent contracted the disease. This, the author believes, is additional strengthening evidence for his belief that tuberculosis developing in adults arises from a recent infection. He points out the advisability of isolating in sanatoria the open cases from "closed" cases as a preventive measure against re-infection of the latter.

H. Kramer, Bull. Office internat. d'hyg. pub., *28*:1812, 1935.

An Outbreak of Botulism in New Jersey

A family of five all became suddenly ill soon after having consumed a jar of home-preserved peppers. Botulism was early diagnosed but two persons died before botulinus antitoxin was available. The three remaining received antitoxin and one of these died on the fourth day. The incubation period varied from 21 hours to 69 hours after consuming the presumably contaminated food.

The symptoms of the disease seemed to manifest themselves in proportion to the quantity of toxin ingested. One of the survivors who had the least amount of the contaminated peppers had the longest incubation period. The symptoms were those of profound systemic toxaemia, characterized by oculomotor disturbances, drowsiness, and weakness. The necropsy reports showed toxin neuronophagia and a chronic passive congestion of all organs. Unforunately, none of the canned peppers were available for laboratory examination and no toxin was detected in the stomach contents.

Frank S. Caprio, J.A.M.A., *106*:687, 1936.

Meningeal Tuberculosis

The relative incidence of human and bovine tubercle bacilli in meningeal tuberculosis in England and Scotland has been reviewed by Griffiths and by Macgregor. The bovine type was encountered in 25 per cent to 40 per cent of cases. In this article Munro and Scott report on 50 cases of meningeal tuberculosis, 18 of which were due to the bovine type. Sixty per cent of the rural cases and 22 per cent of the urban cases were due to the bovine type. In a number of the cases, exceptional facilities for epidemiological investigation were available. In all of these where the human type was present in the cerebrospinal fluid, there was, or had been, a known case of pulmonary tuberculosis in the home. Where the bovine type was present no case of visceral tuberculosis was found in the home. The authors therefore incriminate the milk supply and, discussing the existing legislation regarding the examination of cows, conclude that it is inadequate.

W. T. Munro and H. Scott, Lancet, Feb. 15, 1936, p. 393.

Measles and Convalescent Serum

An outbreak of measles occurred in a boys' preparatory school where there were 97 boys, 56 of whom had not had measles. Isolation of contacts of the first case was enforced but 9 further cases appeared in two weeks in different parts of the school. A small supply of convalescent serum was later obtained and 22 of the remaining 46 susceptibles received 5 cc. intramuscularly. The exact date of exposure was uncertain but attenuation rather than complete protection was desired. All 56 susceptibles developed measles, giving an attack rate of 100 per cent. However, definite attenuation was obtained in 21 of the 22 receiving serum. There

was an entire absence of toxaemia and cough and of sequelae in these cases. All those not receiving serum had a certain amount of bronchitis, one developed bronchopneumonia and two subsequently developed albuminuria.

G. W. Elkington, Br. Med. J., Feb. 15, 1936, p. 308.

A Milk-borne Outbreak of Scarlet Fever

An explosive outbreak of scarlet fever occurred in the borough and rural district of Chelmsford, England, with 6 deaths and a total of 487 cases notified. Subsequent investigation showed that 380 of these cases suffered their onset within a period of 8 days. It was found that nearly all of the cases used milk from one dairy, which in turn received milk from several farms. From one of the farms a notification of scarlet fever was made and investigation at this farm showed three possible sources of infection. The first was a cow with acute mastitis following an injury. A haemolytic streptococcus from her milk, however, was not of type 2 (Griffiths) or other type pathogenic to man. The second possible source was a worker with a septic hand due to haemolytic streptococcus type 2, but it was proved that he had not had anything to do with the handling of the milk. The third possible source was a milker, Mr. X, who was milking while he had a very sore throat during the first few days of the epidemic, but had at no time a rash. His son developed scarlet fever 5 days later. His wife and other milkers on the farm had sore throats from which type 2 haemolytic streptococci were demonstrated. All were, therefore, potential sources of infection of type 2 haemolytic streptococci infection. During the epidemic all the men in this dairy had sore throats and swabs revealed type 2 streptococci, yet they presented no rash. The discussion of the epidemic emphasizes the fact that there were probably many more infected with the haemolytic streptococcus in this outbreak but cases showing no rash were not notified as scarlet fever. However, the cases without a rash were suffering from the same infection as those with a rash. Dr. Sleigh suggests discontinuing the term "scarlet fever" since it focuses the attention of physicians and laymen on the rash, which is the least important feature of the disease. He stresses the inherent dangers in the missing of cases which do not present a rash, as instanced by Mr. X who continued to milk while ill, with the resultant toll of cases and deaths. He suggests that the term "haemolytic fever" be substituted for "scarlet fever".

J. C. Sleigh, Med. Off., *60*:25, 1936.

An Epidemic of Ringworm due to Epidermophyton Floccosum (Inguinale)

This epidemic involved 52 firemen in a crew of 400 on a modern passenger ship. The first two cases occurred in August, in September four more, and by the end of October 32 cases had reported. In spite of isolation of these cases the epidemic continued to spread. The whole crew were inspected and more cases were found.

The origin of the infection was not definitely established but was probably spread by the careless interchange of towels, blankets and bedding. About half the cases showed intertrigo of the toes and most of them had "bat-wing"-shaped red, finely-scaling plaques in the groins. Some had circinate patches in the axillae only, while five of the 52 showed a disseminated eruption on the trunk and extremities.

Preventive measures undertaken were a weekly inspection of the crew with isolation and treatment of those affected; daily inspection and cleaning of sleeping quarters; the issue of clean towels three times a week; disinfection of blankets and mattress covers; scrubbing of bathrooms and toilet seats; and the daily renewal of footbaths of 1 per cent solution of sodium hypochlorite in the wash rooms. No further cases occurrred after institution of these measures.

S. T. Mercer and G. V. Farber, Arch. Dermat. & Syph., *32*:62, 1935.